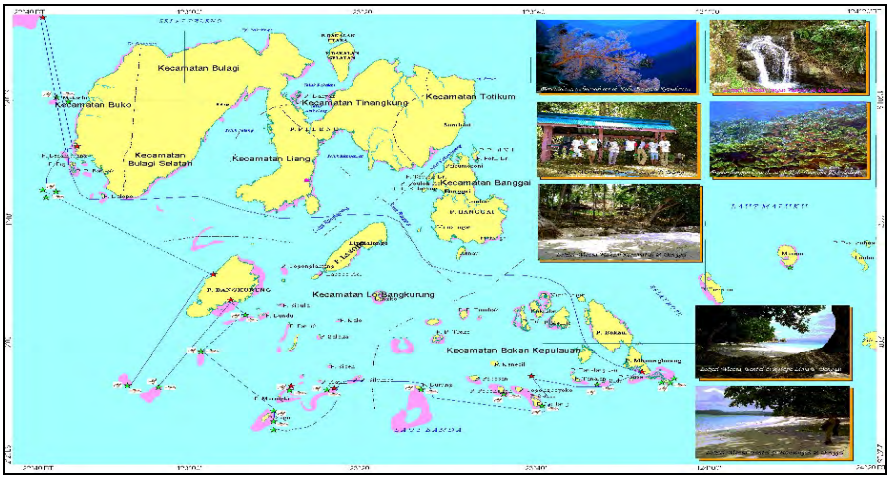
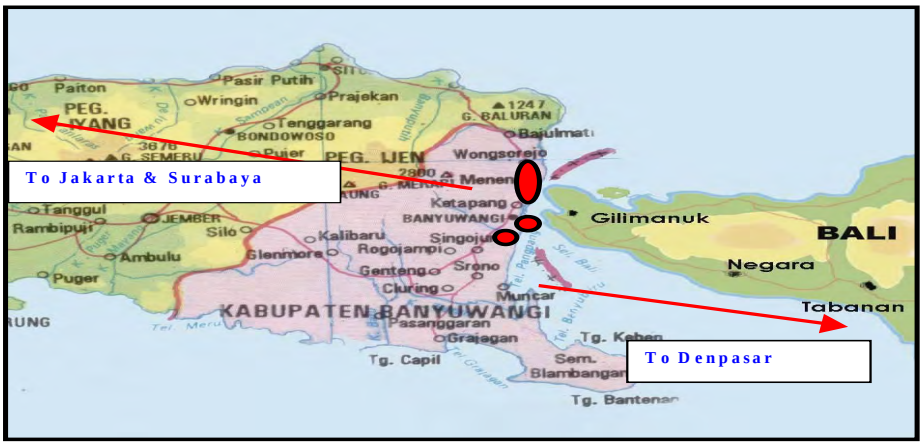
THE INDONESIAN ORNAMENTAL FISH TRADE: CASE STUDIES AND OPTIONS FOR IMPROVING LIVELIHOODS WHILE PROMOTING SUSTAINABILITY IN BANGGAI AND BANYUWANGI





The International Seafood Trade: Supporting Sustainable Livelihoods Among Poor Aquatic Resource Users in Asia (EC Prep Project EP/RO3/R14)

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Glossary

Term or Abbreviation	In Full/Translation	Translation/explanation
Indonesian Administration and Organisations		
Bangkep	Banggai Kepulauan	Banggai Archipelago (geographical)/Banggai Kepulauan Regency (administrative)
BKKBN	Badan Kependudukan dan Keluarga Berencana Nasional	Population and Family Planning Department (Regency level), now merged with the Catatan Sipil or Civil Registry for Bangkep
BPD	Badan Perwakilan Desa	Village Council (lowest level of elected representatives under current Indonesian system)
BPD	Bank Pembangunan Daerah	Government Bank (Central Sulawesi),has a Branch in Banggai
Bupati	Regent	Highest Regency official, previously appointed by the Governor, under new OD rules in future will be elected
Camat	Head of a Kecamatan	an appointed civil servant
Desa	Village	Lowest administrative entity which has an elected body (BPD) and legislative powers (issuing PERDA)
Dinas	Government Department	Provincial or Regency level
DKP	Departemen Kelautan dan Perikanan	Marine and Fisheries Department (National level)
DKP	Dinas Kelautan dan Perikanan	Marine and Fisheries Department (Provincial or Regency level)
Dusun	Sub-village	Lowest administrative level. Most Desa have several Dusun, often far apart and with very different characteristics and needs
Kabupaten	Regency	The administrative level with most autonomous powers under OD
Kades	Kepala Desa	Village Head
KD	Kepala Desa	Village Head
Kecamatan	District	Administrative area comprising several Desa or Kelurahan, each Regency will have several Kecamatan.
Kelurahan	Suburb	Equivalent to Desa in an Urban area, has many fewer powers than a Desa (village)
KNPI	Komite Nasional Pemuda Indonesia	National organisation for people under 40 years old, has a branch in Bangkep Regency
Koperindag	Dinas Koperasi, Perindustrian dan Perdagangan	Department of Co-operatives, Trade and Industry (for Banggai Regency these have been combined)
Lurah	Head of a Kelurahan	An appointed civil servant
OD	Otonomi Daerah	Regional Autonomy, the relatively new system for distributing executive and legislative powers
PLS	Pendidikan Luar Sekolah	Education outside school - for people who were unable to complete formal education, mainly literacy and numeracy
PNS	Pegawai Negeri Sipil	Civil Servant (once appointed, until retirement on government pension. The goal of most people in seeking higher education is to become "PNS")
POSYANDU	PUSKESMAS Pembantu	A sub clinic, usually at Village level, staffed by a village nurse/midwife, possibly also a paramedic, several under the aegis of each PUSKESMAS
PUSKESMAS	Pusat Kesehatan Masyarakat	A main clinic, where basic medical services and remedies are available, in some cases with limited in-patient facilities, usually at Kecamatan level

Term or Abbreviation	In Full	Translation/explanation
Indonesian Administration and Organisations Continued		
PPK	Pendidikan Kesejahteran Keluarga	Official women's group, generally run by the wife of the highest local Government official (usually the Camat's wife at District Level)
Sekab	Sekretaris Kabupaten	Regency Secretary (highest career civil servant at regency level, works closely with Regent)
Sekdes	Sekretaris Desa	Village Secretary (No 2)
STPL	Sekolah Tinggi Perikanan dan Kelautan	Marine and Fisheries Institute of Higher Education - a University level academic institution in Palu
YPH	Yayasan Palu Hijau	Green Palu Foundation, Central Sulawesi Environmental & Development NGO founded in 1987
YBN	Yayasan Bahtera Nusantara	Bali ??? NGO founded in ????

International Organisations and Programmes	
CCIF	Conservation and Community Investment Forum
DFID	Department for International Development (UK)
GCRMN	Global Coral Reef Network
IMA	International Marinelife Alliance
MAC	Marine Aquarium Council
MAMTI	Marine Aquarium Market Transformation Initiative A programme being set up by MAC, Reef Check Foundation and CCIF
NACA	Network of Aquaculture Centres in Asia
Reef Check Foundation	An international coral reef monitoring and conservation organisation, member of GCRMN
STREAM	Support to Regional Aquatic Resources Management

Local Term	Translation/explanation
Bajo	An ethnic group, often called Sea Gypsies or Sea Nomads, and who call themselves the "Sama" people. Traditionally Bajo people live at sea from birth to death but now many have settled in villages. Bajo homes are always surrounded by or over the sea, usually on stilts or on platforms surrounded by water. The Bajo tend to maintain strong family ties, which often cross internal and international boundaries. Traditional Bajo livelihoods are all marine-based.
Bebese Tayung	Local name for *Pterapogon kauderni* in Bajo (Sea Gypsy) language, meaning sea urchin fish
Bodi	wooden vessel, usually larger than a sampan
Capungan	Local name for *Pterapogon kauderni* in Banggai language
Dukun	A traditional healer using herbs, massage and other traditional remedies; also a shaman or witch equivalent, doing "black" or "white" magic. Usually paid in kind (cigarettes, food items etc) as well as or instead of cash, which many (especially the healers or "white" magic workers) won't accept. Those working "black" magic are greatly feared. For some medical problems, e.g. broken bones, even doctors and other medical practitioners admit that Dukun can sometimes do better than them, and often refer "hopeless" cases to a Dukun.
Ikan asin	Dried Salt Fish

Local Term	Translation/explanation
Katinting	A type of long-shaft outboard motor. The most frequent type uses small Honda petrol engines (5.5 HP, 9 HP and 13HP) which are directly attached to a steel rod which rotates within a hollow steel shaft. A small propeller is fixed to the end of the rod, and the bearings are made of wood or bamboo, usually fixed with nylon fishing line. These are noisy but surprisingly efficient, and above all easily maintained with readily available or replicated spare parts. Most fishers and many other villagers can do basic repairs themselves, and sometimes even complete rebuilds. To own one is the first goal of every fisherman who does not yet have one, and the immediate response to any query regarding type of aid most desired.
Keramba	Sea-borne net fish cage, with some floating device, anchored to the bottom
Kios	Stall, a typical Indonesian small business, selling what are defined as basic goods or "bahan pokok", many in small quantities (e.g. one-use sachets), often offering some credit facilities
Letter Six	Local name for the Palette Surgeonfish, *Paracanthurus hepatus*
Lurah	Head of the Kelurahan, an appointed civil servant
Ojek	Motor cycles used for public transport, the owner must carry an extra helmet for the passenger. Most not officially registered or insured in any way. Most are bought on hire-purchase, hoping the income earned will cover monthly instalments.
Other	Explanation
Piyama	Local name for the Blue-ringed Angelfish, *Pomacanthus anularis*
Sampan	dugout canoe

Term or Abbreviation	In Full/Translation	Translation/explanantion
Fisheries & Livelihood related:		
BCF	Banggai Cardinal Fish	A Banggai endemic fish species, Pterapogon kauderni
FGD	Focus Group Discussion	A meeting/gathering of people with a common interest for the purpose of obtaining focused livelihood information
KI	Key Informant	A person with specific knowledge who is interviewed during a livelihoods survey
KM	Kapal Motor	Equivalent to MV (motorised vessel), a vessel requiring a registration permit, usually inboard vessels over 2 tonnes)
LOA	Length Over All	Length from bow to stern for a water-borne vessel
OF	Ornamental Fish	Fish sold for the aquarium trade
OFC	Ornamental Fish Collector	A fisherman who actively catches OF
OFT	Ornamental Fish Trade	
Scientific/Units of Measurement		
C	Degrees Celsius	
cm	Centimetre	
Ha	Hectare	
km	Kilometre	
m	Petre	
ppt	Parts per thousand	
SL	Standard Length	Fish body length measured from tip of mouth to base of tail, not including the caudal (tail) fin.
Manta Tow	A standard GCRMN monitoring method	Suitable for covering extensive areas with minimal equipment/expense which can be applied to a wide range of shallow-water survey types.
Reef Check	A standard GCRMN monitoring method	Designed for use by volunteer community members, usually conducted using SCUBA

Executive Summary

I. Introduction

The first step in the implementation of the case study was a workshop, held from 24th to 26th August 2004at the Sari Segar Resort Hotel, Denpasar, Bali, Indonesia. Representatives of Indonesian organisations and international resource persons attended this meeting organised by STREAM Indonesia, which was facilitated by NACA and the Directorate General of Aquaculture (NACA focal point). The methods and site selection were decided at this meeting, based on Anonymous 2001 & 2002.

I.1 Methods

I.1.1 Secondary Data

Data were sought through the internet, using email to contact known sources and internet search techniques to find particular types of information. In particular data on specific species, international trade data, certification data, information on relevant programmes and organisations, reports from previous surveys and relevant scientific research, etc. Statistical and other data were obtained from Government Departments by going to the relevant offices and requesting information. The information/data from the Badan Pusat Statisik (BPS) was available for sale in book form. Other data was provided as printouts, photocopies or through direct communication (speaking and writing).

I.1.2 Livelihoods Primary Data

Livelihoods data was collected and analysed largely through methods described at the workshop and in the materials provided through STREAM (Anonymous 2001 and Anonymous 2002). The main tools used were: Focus Group Discussions (FGD), Key Informant Interviews (KII), Wealth ranking Venn Diagram and Seasonal Calendar. A significant proportion of information was obtained from direct observation and through casual or every day interaction with people in the case study area. Additional information was gained through involving local people in activities, as guides or requesting demonstrations of specific techniques. The livelihoods data were supplement with additional biophysical data.

I.2 Site selection

Selecting representative areas over a country the size of Indonesia is not an easy task, so the selection was done at two scales, first selecting two representative areas and secondly selecting survey sites within these areas. The rationale behind this choice was that the resulting data should give a good picture of many facets of the diverse Indonesian ornamental fish trade, which covers many different natural and human environments over a huge spatial scale.

The first area was in Sulawesi, which is known to be one of the main source areas for ornamental fish, but with no major buyers or exporters. Within Sulawesi, the Banggai Archipelago was chosen as there is trade in many ornamental species from this area, including trade in the Banggai Cardinalfish, ***Pterapogon kauderni***, an endemic species, for which there was a reasonable level of secondary data available.

The second area was the East Java/Bali area, which is an area with many ornamental fish collectors, traders and exporters but fewer local fishery resources. The selected location in East Java was Banyu-Wangi, a major centre of ornamental fishing, and Denpasar, Provincial Capital of Bali, with several major trading companies and an international airport.

II. Stakeholders

The ornamental fish trade affects the lives of many people and involves many organisations, either directly or indirectly. One goal of the case studies was to identify these "stakeholders", current and potential, in order to better understand the mechanisms at work in the ornamental fish trading system, identify which among them are poor and also which among them could contribute to alleviating poverty in some way and/or to improving sustainability of the trade.

II.1. Major Stakeholders Directly Involved in the Trade Chain

II.1.1. Collectors: Collectors (Ornamental Fish Collectors, OFC) are fishers who catch ornamental fish. Collectors are not a homogeneous group. Based on equipment they can be divided into two categories, both of which frequently use cyanide as part of their equipment when fishing for certain species:

- **Breath-hold diving Collectors**: collect marine ornamentals in shallow waters usually to a depth of 6-10 meters for limited periods of time without use of any breathing apparatus. They use simple

equipment such as locally made wood and glass goggles or cheap diving masks, fins made of plywood, etc. Most own nets or other fishing gear and a boat, usually a dug-out canoe (sampan), powered by oar or a small long-shaft outboard (katinting).

- **Compressor or *hookah* diving Collectors:** who collect marine ornamentals in deep waters often up to 40 meters for longer periods of time, using compressors of the garage forecourt type, adapted with various degrees of sophistication and powered by simple combustion engines.

Collectors can also be divided based on their status, as follows:

- **Independent Collectors:** these fishers own the equipment they use (generally for breath-hold fishing) and are free to sell to any buyer
- **Semi-independent Collectors:** these fishers own equipment which enables them to collect independently, but sometimes join the crews of financiers on a temporary basis. Some have compressor-diving skills.
- **Dependent Collectors:** these fishers do not undertake independent collecting, but are tied to a financier who provides the equipment they use, and buys all their catch. Most compressor diving collectors come into this category.

Collectors can be further divided into **full-time** collectors, and **part-time** collectors, who have other occupations, including other types of fishing and/or land-based activities.

Banggai Local Marine Ornamental Fish Collectors

In the Banggai Islands, local villagers have been involved in the OFT since the late 1980s. Most villages now have one or more co-ordinators, who act as a representative in negotiations with buyers. In all cases the co-ordinators are also collectors and none of them buy fish from or store fish for other fishers.

The two main ethnic groups involved as OFC are Banggai, where only the men take part, and Bajo, where often whole families are involved in OFC. Depending on species collected, methods used and organisation of collecting, three types of local OFC can be identified, all of which are part-time collectors:

- **Independent breath-hold fishers**: only catch BCF and other species which they can obtain using simple equipment which they own. This type of OFC was found in all active OFT villages surveyed except Panapat. Few use cyanide
- **Compressor fishers**: collect a wider variety of ornamental fish. Many of these collectors use potassium cyanide (locally called potas) to facilitate capture. No local compressor collectors met during the survey are full-time ornamental fish collectors, all collect food fish (often also with cyanide) or invertebrates such as lobster, sea cucumbers, pearls etc. A few of these collectors are independent, owning their equipment, some are semi-dependent, collecting whenever they have the use of equipment owned by their regular employer or semi-dependent, collecting when they have an opportunity to use equipment, either from local or outside sources. A few are in the process of acquiring their equipment in instalments, either fixed monthly payments or through arrangements related to the proceeds of fishing, generally mainly food fishing.
- **Dependent Fishers:** do not own any equipment or go fishing on their own, but go along with buyer boats, using gear supplied by the buyer boats and fish alongside the boat crew. All involved get paid a fixed price per fish caught. This arrangement was only found at Panapat during the survey but may occur elsewhere in Bangkep.

Outside Collectors (Banggai):

These are fishers based outside the Banggai Archipelago who operate in the Banggai waters with no link to local OFC, villages or authorities. Some of these OFC used to work with local communities until they knew the fishing grounds well enough to work alone. All are viewed as thieves by Bangkep villagers, who feel powerless to do anything about the situation. According to FGD and KI participants, most are Balinese or Madurese (a Javanese ethnic group, which includes Banyu Wangi collectors), and reputedly some have links in Kendari, Luwuk and Makassar.

Banyuwangi Collectors

Banyu Wangi collectors are more homogeneous, being of Madurese ethnic origin. They use barrier net, scoop net, closed nets and potassium cyanide. They can be divided into three main groups:

- **Independent Breath-hold Collectors**: these fishers operate locally.
- **Semi-independent Breath-hold Collectors:** in addition to local collecting**,** these fishers sometimes join as crew on long-distance collecting expeditions.

- **Dependent Compressor or *hookah* divers:** who collect marine ornamentals in deep waters to a maximum depth of 40 meters for longer periods of time. Most of these collectors are permanent crew employed, trained and equipped by the financier or operator, but there are also some "piece rate" collectors. Because of decreasing fish stocks around their home area, these collectors frequently undertake 15-25 day fishing trips usually with 15-20 fishers per boat. Fishing grounds include various areas of Sulawesi including the Banggai Archipelago, Nusa Tenggara, Maluku and Irian Jaya. Most collectors are full-time but some have other (often seasonal) activities such as farming.

II.1.2. Initial Buyers and Financiers

Initial Buyers:

In Banggai, there are no longer any Financiers operating for the ornamental fish trade, though there were several in 2001. The local collectors sell to a variety of buyers who come to the collecting villages. The initial buyer types identified were:

- **Collector/Buyers,** who work with local dependent fishers, going to the fishing grounds together (e.g. Panapat): These boats and their crews are from Bali, bring all the collecting equipment, They sometimes also buy fish from independent collectors.
- **Buyer/Collectors,** who buy some or most fish (especially BCF) from local independent OFCs, but also sometimes fish alone. This pattern is used by the boat operating out of Luwuk, owned by a Palu-based company (e.g. Tolokibit).
- **Buyers** using wooden boats who used to be OFC but no longer fish and buy from local independent OFC (Tumbak boats visiting Bone Baru, Monsongan, Tolokibit, Toropot, and Kalupapi, possibly other villages).
- **Buyers** who operate via the PELNI passenger liner KM Sinabung, which has a regular fortnightly schedule from Jakarta to Bitung (near Manado) via Banggai and other destinations. These are buyers from Tumbak who used to operate via wooden boats as above.

Financiers:

Financiers are middlemen usually found in communities where ornamental fish collectors are not organised. They fund diving trips of collectors, purchase the catch from the collectors, screen, pack and ship the fish to higher level traders, directly or through transport/cargo agents.

In Banyu Wangi, financiers play a key role in the trade, and often ship direct to main traders or exporters in Bali, Surabaya and Jakarta. The financier provides the equipment, including necessary repair and maintenance (e.g. boat, compressor, goggles, flippers, nets, food, fuel, oxygen, and packaging materials), and pays the penalty fee if the boat is caught by law enforcement officers. It is common practice for the financiers to make cash advances to collectors before they go on a trip which are deducted from the collector's earnings on their return. Financiers play an important role in providing credit for the immediate needs of the collectors and their families who have no access to formal credit institutions. In addition, these financiers often hire full or part-time workers (screeners, packers and recorders).

II.1.3. Intermediary Buyers, Main Traders and Exporters

Intermediary Buyers and Main Traders: these are companies based in major urban centres (especially Manado, Denpasar, Surabaya and Jakarta) who buy fish but are not involved in the collection process and do not go to the fishing grounds. They are distinguished by size of operation and sales route. Main Traders will be registered businesses with full facilities for the holding of marine ornamental fish, carry large and varied stocks, often deal regularly with airfreight and deal regularly with (or even function as) exporters. Main buyers will rarely deal with collectors, and usually buy from initial or intermediary buyers and financiers. Intermediary buyers may be much smaller in scope and may not have full company status. Intermediary buyers may buy from collectors, initial buyers (including collector/buyers), financiers, or other intermediary buyers, and generally sell to Main Traders in a nearby location, without use of airfreight (e.g. in Manado and Denpasar)

Exporters: these are companies who actually export marine ornamental fish, therefore have a direct link with importers and are dominant players in the trade chain. They usually have their own aquarium facilities and fish purchased from suppliers are further screened and purged in their holding facilities before packing and shipment to importers. They hire screeners, aquarium cleaners, packers, and administrative staff for their operations. Generally exporters are also Main Traders, sometimes with

branches in several locations, though not all main traders are exporters. Exporters are generally based in Denpasar, Surabaya or Jakarta.

II.1.4. Other Inconspicuous Stakeholders

- **Packers and Odd job Workers:** In Banyuwangi and Denpasar, packing workers are mostly men, and work part-time, or do the work as part of a wider general assistant's job(odd-job worker). In Banggai, packing is done by the initial buyers.
- **Screeners:** Screeners at the exporter's level are regular skilled and experienced men or women staff who evaluate the fish for quality and acceptability and only those fish that pass their screening gets paid. This staffs sometimes handle the finding of fish that are ordered by buyers but not in stock.
- **Aquarium Cleaners:** Aquarium cleaners at the exporter's level are regular men and women staff whose main function is to clean the aquariums and holding facility and change the seawater in the aquariums. They also have the responsibility of fish husbandry and feeding.

II.2. Local Community

Within the local community certain people have an especial interest in or have the potential to affect the OFT. These include:

- **The Village Head (KD), Village Secretary (Sekdes) and Badan Perwakilan Desa (BPD):**

The BPD is the lowest level of elected legislative assembly. It is supposed to work with the KD and Sekdes. Together, these village leaders are supposed to ensure Government programmes are implemented effectively and efficiently, and to represent the village people at higher levels.

Current involvement of the KD in OFT includes in many cases levying a payment from visiting OFT vessels wishing to operate in village waters (e.g. Panapat IDR500,000 per vessel per visit; Toropot IDR50 per fish), and sometimes refusing permission to certain OFT vessels (e.g. Toropot banning Bali boats which visit Panapat, Panapat banning Tumbak vessels). So far this is usually without firm legal grounds. In some cases village leaders are also directly involved in collecting and in organising the trade, though in all such cases encountered these roles preceded their taking up official positions.

Under OD (Otonomi Daerah, Regional Autonomy), the BPD has the power to pass local laws and regulations, called Peraturan Desa or PERDES, which can then be enforced at village level, without going through the cumbersome (and often ineffective) justice/court system. Before becoming effective, these PERDES have to be agreed also by the Sub-District (Kecamatan) and District (Kabupaten) Government levels. There are two main restrictions to the PERDES: they cannot conflict with higher level (District, Provincial or National) legislation; and the penalties (especially fines) which can be imposed for infractions are limited.

However potential involvement could extend to regulation of all aspects of OFT at local level, from capture to sales. Regulations on equipment and fishing methods, fishing seasons, locations (e.g. rotations, no-take zones), prices, holding facilities, user fees/licences etc are all possibilities.

These village leaders, in their official capacities, also have the right and the duty to communicate with higher levels on behalf of their villagers. Therefore they can be advocates for the support needs of OFC and the OFT in order to improve contribution to local incomes, both for OFC as individuals and for the community as a whole (e.g. via licensing fees, taxes etc). Conversely, if the higher levels see the need for programmes to support the OFC and OFT, these leaders will be key implementers at the village level.

- **Other fishers/marine resource users**

These people (often family members of OFC or sometimes even OFC themselves) are also dependent on the marine resources of the waters fished by the OFC. If they use destructive methods, their activities can negatively impact the OFC resource base. Conversely, if the OFC use destructive methods, they can reduce the resource base for other fisheries/fishers. Many of the destructive activities such as cyanide fishing are also illegal.

Destructive methods used by OFC include the use of cyanide and deliberate or careless use of equipment leading to mechanical damage to coral colonies and other substrate. Destructive activities by other fishers include bomb and cyanide fishing. Other resource use activities which were seen to directly cause considerable damage include coral mining and collection of invertebrates (skin diving, compressor diving or gleaning at low tide) where coral colonies are broken apart or overturned or unintentionally damaged by trampling or similar. Anchor damage was clearly visible at several survey sites. Crown of thorns starfish (COTs) ***Acanthaster plancii*** were seen in above average numbers at some sites, indicating

imbalance in the ecosystem possibly caused by the over-harvesting of Napoleon Wrasse, ***Cheilinus undulatus***.

II.3 Local Government Departments and Agencies (Banggai Kepulauan/Central Sulawesi)

Local Government Departments and Agencies below are the main agencies directly concerned with OFT and are divided into District level and higher levels.

District level (Kabupaten Banggai Kepulauan):

- **The District Office (Kantor Bupati):**

The District Office is largely concerned with overall policy, and as such has a major role to play. The two major officials are the Bupati, the highest elected official, who is assisted by a deputy (Wakil Bupati) and the Sekretaris Kabupaten (District Secretary, often referred to as Sekab), the highest career civil servant. Support from these key stakeholders is vital. Substantial support was provided during the case study especially for holding the post-survey stakeholder meeting. Official policy includes developing sustainable use of marine resources.

- **The Fisheries and Marine Service (DPK - Dinas Perikanan dan Kelautan)**

The Fisheries and Marine Service is the Government agency with the most direct interest in the OFT, at the collecting level. Responsibilities include socialisation of fisheries regulations, technology and other capacity building activities; surveillance and some aspects of enforcement of Fisheries and Marine related legislation; issuing of fishing/fishing vessel permits and licences; maintaining data on fishers and marine/fisheries resources, including catch and other data; advice on Fisheries and Marine related matters to the District Legislative and Executive bodies; drawing up Fisheries and Marine programmes for the District (which are approved, rejected or modified by BAPPEDA and the DPRD), and liaison with higher level Fisheries and Marine Departments (Provincial and National).

A hatchery facility is being built near Bone Baru, one of the surveyed OFT villages, intended for grouper seed production. However the facilities available and the expertise of personnel, have the potential to assist in the culture of other species and/or other fisheries-related activities.

Human and other (especially operational) resources are very limited, but the staff are in the main young, keen fisheries graduates, and work beyond their official duties, in terms of time and activities undertaken. For example, most assist as teachers at the Fisheries High School in Banggai. The Program Head is especially keen to promote conservation as he sees current practices as being largely unsustainable. The Department staff admitted they have no real data on most aspects of marine resources and fisheries, especially stocks and catch levels. There is only one surveillance/enforcement officer, a programme to involve local communities is seen as the way forward, and early steps have been taken. However without PERDES, the village surveillance groups have very limited powers.

- **The Trade and Industry Service (Dinas Koperasi, Perindustrian dan Perdagangan)**

This Government agency is responsible for trading licenses and fees, and for all business licensing/registration, from single traders (e.g. ***kios***) up to larger companies (CV/PT), for all commodities and types of business, unless specifically covered under another department (e.g. vessel registration). Very few businesses actually take out permits unless required for a bank loan, as a license to operate is a basic condition of all business loans. For trading outside the area, whether in-country or for export abroad, all commodities theoretically require a certificate and have to pay a fee to the Service. However none has so far been issued for ornamental fish. For the past two years at least there has never been any sanction or action taken against people or companies without licenses or who don't report (6 monthly) as per the rules, for any commodity. So far, no business licences SIUP (Surat Ijin Usaha Perdagangan = trading licence) or TDP (Tanda Daftar Perusahan = business registration) have been granted for ornamental fish related businesses. The Service would welcome moves to make the OFT more organised, with meaningful contributions to local Government income.

- **The District Parliament (Dewan Perwakilan Rakyat or DPRD)**

This elected body is the legislative assembly for the District. Potential roles related to the OFT include: the power to propose and pass or refuse to pass District level legislation (PERDA); the power to approve, reject or modify proposals made by government departments; the power to approve or reject PERDES proposed by Village level legislative bodies (BPD); the power to influence District policy. It can be seen that support of the DPRD is essential. The DPRD representative at the Stakeholder meeting was very supportive and made several pertinent observations and suggestions.

Higher Level

- **Provincial Fisheries and Marine Service in Palu (DKP - Dinas Perikanan dan Kelautan Propinsi Sulawesi Tengah)**

Under OD - Regional Autonomy - the Provincial level government agencies have essentially a co-ordinating role, and should play a supporting role, for example in capacity building, funding specific interventions, etc. The Provincial Fisheries and Marine Service facilitated a meeting in Palu to review the case study initial results. At this meeting valuable information and suggestions were made.

- **Fish Quarantine in Luwuk (Kantor Stasiun Karantina Ikan Luwuk-Banggai)**

The Luwuk fish quarantine station (Karantina) was opened in 2003, and covers 5 Districts, Luwuk Banggai, Banggai Kepulauan (Bangkep), Tojo Unauna, Poso and Morowali. Previously karantina services for this area were administered from Makassar. There are no branch offices in Bangkep, or the other three Districts. There is also a station in Palu, with whom the Luwuk Karantina work closely. Karantina tasks include checking fish health, species/type of fish and the quality of water used in transport/holding. All fish or marine products leaving the area, whether in-country or for export should have a certificate from the Karantina. Certificates issued by one office, e.g. in Luwuk, are good for all levels up to export. The only OFT business which has ever reported is based in Luwuk and Palu, certificates to Surabaya are requested.

Live product is returned alive to the owner, testing is non-destructive, and extra checks can be made on demand (e.g. to comply with importing country regulations). Testing is done on a sample basis, either the Karantina staff go to the operator, or the fish are brought to the laboratory. There are 8 stages in the rules and if there are irregularities, the highest sanction is refusal to grant a certificate. The Karantina staff expressed a desire to work with other stakeholders to improve the system of marine product marketing, and welcome the idea of certification, especially if they are involved. The staff feel it is difficult to know how to reach ornamental fish trade "stakeholders" as they are dispersed - many small operators, not just a few easily targeted companies, and there is no umbrella body such as a local Chamber of Commerce or association of people with fisheries related businesses.

- **BKDSA (Balai Konservasi Sumber Daya Alam) Propinsi Sulawesi Tengah, in Palu**

The BKSDA is the conservation branch of the Forestry Department, and is responsible for all protected areas and protected species, terrestrial and marine, including surveillance of the transport and trade of endangered species which are protected by law.

The Palu-based Provincial BKDSA covers the whole of Central Sulawesi. As Bangkep has no official marine protected area (MPA) to date, BKSDA has no staff permanently in Bangkep. Involvement in OFT currently occurs in Palu, when the fish are in transit by air. At the Palu airport, the BKSDA work closely with the Karantina in monitoring shipments of live fish, in order to prevent the trade of protected species. Checks are made on samples, and so far no infractions have been reported. Should there be any National MPA established in Bangkep, as is currently proposed, BKSDA involvement could be greatly increased.

II.3 Service providers (Transport & Other)

- **Sea Transport:** The main means of transport for the OFT from Bangkep other than buyer/collector owned/operated boats is by KM Sinabung, one of the PELNI (the Government owned passenger liner shipping company) ships, which carries some cargo as well as passengers. KM Sinabung calls at Banggai harbour every other Thursday night on her way to Bitung, near Manado, arriving the following morning. Every other Friday lunchtime she calls at Banggai on her way to Jakarta (around 2 days). The PELNI staff are not aware of the use of their ship as a means of transport for aquarium trade produce. The fish are loaded as ordinary luggage, without extra payment or reporting. The potentially explosive oxygen tanks used for packing the fish are carried concealed (on the occasion witnessed, wrapped in sacking), thereby posing a hazard of which the crew and other passengers are unaware. Therefore the PELNI company does not reap any substantial benefits from this role, and unknowingly carry dangerous items, a risk to people and property.
- **Air Transport:** the small aircraft (propeller-powered) air service by Merpati out of Luwuk is not used for the transportation of ornamental fish. However the various plane services out of Palu are used. The carriers are Merpati, Bouraq and Lion Air, and ornamental fish are carried to Surabaya, Denpasar, Jakarta and Makassar. The airline is responsible for the safe arrival of the consignment - any dead fish will result in refund or compensation. There are rarely any casualties. The fish are

placed in a special reserved part of the hold, of limited dimensions and sometimes used for other items. Larger consignments will be divided into 2 or 3 flights, on the same and/or subsequent days.

- **Road transport:** ornamental fish are transported by road both in Sulawesi and in Bali/Java. Generally "pick-up" trucks or small lorries are used. Sometimes these belong to buyers, sometimes they are hired vehicles. Fish are also transported on general public transport, e.g. buses, often with high mortality rates.
- **Oxygen providers:** one item essential to the OFT is oxygen, used in packing ornamental fish for transport over all but the shortest of distances. At present, this commodity is not available in Bangkep, and is brought by the various buyers/collectors from outside the area. Under the Bangkep Health Department MATRA programme, they hope to have an oxygen machine in 2005 or 2006. The department hopes to sell oxygen for non-health uses also, e.g. welding and tourist diving operations, and now they are aware of the possibility, are keen to supply to the OFT also.
- **Informal finance providers and sellers of supplies and equipment:** like most fishermen, OFC are rarely out of debt. In many cases this is to initial buyers or financiers. Currently in Banggai the main finance providers are local store (***kios***) owners who provide most daily supplies and basic equipment, pawn brokers and ***rentenir*** or "professional" loan sharks.

II.4 Trade Relevant Associations

There are several potentially relevant trade associations at National level, but do not yet have branches in Central Sulawesi and there are no branches so far in Bangkep. These include:

- Indonesian Fisheries Federation
- Indonesian Ornamental Fish Exporters Association
- Indonesian Aquaculture Society
- Indonesian Coral, Shell and Ornamental Fish Association

One such association does have a Central Sulawesi Branch, based in Palu:

- **APIHI (Asosiasi Pengusaha Ikan Hias Indonesia):** The Palu Branch of this ornamental fish traders association was represented at the stakeholder presentation in Palu. There is a feeling that the current regulations are onerous and confusing. The association would welcome a general improvement in regulation of the trade, especially moves which would make procedures clearer and easier to comply with, and which would support sustainability of the trade.

II.5 Sources of Expertise and Potential Support

Potential sources of expertise and support are many and varied but a few key institutions are listed here:

The Marine Aquarium Council (MAC) and MAMTI Initiative

- **MAC**: The Marine Aquarium Council (MAC) has been active in promoting sustainability within the marine ornamental trade since 1988. MAC members represent trade and conservation interests and come from a variety of relevant backgrounds. One major achievement of MAC has been the establishment of a Certification scheme for the marine aquarium trade. The standards, originally in English, are available in Indonesian. MAC, in partnership with other organisations, has already started the process of certification with a number of Indonesian companies and other groups. MAC can only work at local levels once a "scoping" process has been completed, which provides MAC with baseline data on which to make key decisions, and after key local stakeholders have requested MAC assistance formally in writing.
- **MAMTI:** The Marine Aquarium Market Transformation Initiative (MAMTI) is a major project focused on coral reef fisheries and trade reform in Indonesia and the Philippines. MAMTI is co-ordinated by CCIF (Conservation and Community Investment Forum), involving MAC, the International Reef Check Foundation and other partners. The objective of the project is to replace destructive collection practices for marine aquarium fish and corals in these countries with an ecologically and economically sustainable approach. The project is focused largely on the village level, and will build the capacity of a significant number of aquarium fish collector groups and their communities to conform to the Marine Aquarium Council (MAC) Certification Standards. Fishers will be trained in best practices for aquarium fish collection and husbandry, coral reef management and basic business principles. The project will work with stakeholders to establish collection area management plans (CAMP), based on scientific assessment and monitoring of the reefs and stocks.

Banggai Kepulauan District Government Agencies involved in Welfare

- **Health Service:** under the same MATRA programme as the oxygen machine, the Service also has plans for a pressure chamber, interesting for diving fishermen as well as tourism. Pressure chamber operating staff have been trained although when a chamber will be available is not yet certain as no source of funding has been confirmed as yet. In addition, pro-poor health care planning and general improvements in health care infrastructure and services underway should substantially benefit many OFC families as long as they are informed in time and register for the benefits.
- **BKKBN (Family Planning Unit):** the field staff of the BKKBN are a valuable resource, who could be involved in many other programmes as they are on the spot and have detailed local knowledge and data on poverty/welfare indicators at the household level which could greatly assist in planning of many types of activity related to livelihoods, especially for identifying potential participants on an objective basis related to their livelihood status and needs.
- **Education Service:** could play a key role, especially through development of the ***muatan lokal.*** This is an integral part of the new National school curriculum and means local content. There is no National material for this subject. As yet no specific material has been produced for Central Sulawesi as a whole or for Bangkep District specifically. The Service does not have resources to develop such material, but is keen to work with people or organisations to develop and use such materials.

Fisheries High Schools in Banggai Kepulauan District

- **Banggai :** There are two Fisheries High Schools (SUPM Mitra Bahari and SUPM Karya Sama Membangun) in Banggai, both private, run by local NGOs. Founded three years ago, the first class is about to graduate in mid-2005.
- **Liang:** The Marine High School (SMK Kelautan) in Liang started as a private school, but has now become a National supported state school. The headmaster is very pro-active.

Tertiary Education Institutes with Marine Study Programmes in Palu, Provincial Capital

- **STPL:** The Sekolah Tinggi Perikanan dan Kelautan (Institute of Higher Education for Fisheries and Marine) was founded in 2004, and is pro-actively recruiting students in areas where fishing and marine resources are a major livelihood resource, such as Bangkep. In order to do this, one strategy is building links with relevant High Schools such as those in Bangkep, a process that has already begun.
- **Fakultas Perikanan UNISA:** The Fisheries Faculty at Universitas Alkhairaat (UNISA) in Palu has been established for over 10 years. The main emphasis has been on socio-economic aspects and aquaculture, however efforts have been made to ensure as wide a variety of knowledge and especially hands-on experience as possible with very limited facilities and funds.
- **UNTAD:** Universitas Tadulako (UNTAD) is the State University in Palu. Although there is no marine or fisheries department/faculty at UNTAD, there is an aquaculture study programme in the Livestock section of the Faculty of Agriculture, which has recently begun teaching marine ecology and other relevant subjects. Some staff have qualification and experience in relevant fields.

Financial Institutions and Structures

- **BPD:** The Bank Pembangunan Daerah Sulawesi Tengah (BPD) is a Government owned Development Bank, whose function is to build the capacity of Central Sulawesi, with a Branch office in Banggai. The manager is keen for BPD to be more involved in the OFT, with individuals, groups or organisations. There is a programme for capacity building in small business management, which is apparently suitable for people of any educational level as long as they are literate and numerate.
- **Potential Self-Help:** There are a number of self-help structures which could be adapted for use in the Bangkep OFT situation, including the STREAM system (Anonymous 2004).
- **Other:** There are as yet no commercial banking facilities in Bangkep though several major Banks have branches in Luwuk which some Bangkep residents use. Government schemes exist for co-operatives, including rotating loans (***Dana bergulir***) where the initial recipients repay not to the Government but to the next recipients. Few have yet proved successful in Sulawesi, including Bangkep, however if better managed have significant potential.

III. Poor Stakeholders

III.1. Collectors

a. In the Banggai Kepulauan District: 4

- Many collectors are among the poorest fishers. This is not generally because of ornamental fishing as such. In general, these are people who were poor before the ornamental fish trade started. Indeed, the

majority of Banggai fishers qualify as "poor". Compared to other types of fishing, the necessary equipment and skills are relatively low, especially for shallow-water species such as the Banggai Cardinalfish and clown fish. This means that fishers with few other options can take part, and the low price paid per fish means that there is not a general rush of every fisher in the area to compete, so numbers of fishers have remained relatively stable, on average around 20 fishers per collecting village.

- Collectors are mainly of two ethnic groups: (i) Bajo (Sea Gypsy), an ethnic group usually totally oriented towards marine resource use, where traditionally the whole family is involved in both capture fishing and post-harvest activities, and collectors may be male or female and (ii) the native Banggai ethnic group, who tend to be equally at home on land or at sea, but only the men and boys will become collectors, while women and girls may take part in post-harvest activities.
- Few if any are totally dependent on the OFT.
- In many cases, there are one or two better off people who were the initial collectors and now play a co-ordinating role. However they do not finance the other fishers or buy their produce.
- The low prices per fish are a major factor in making the OFT unattractive to local financiers, who all ceased operations between 2001 and 2004.
- If prices were raised without good governance being in place first, many better-off fishers would turn to collecting, cutting out the poor fishers and increase the rate of resource depletion many-fold.

b. In Banyuwangi:

- Most collectors are of Madurese ethnic origin, and relatively recently moved to Banyuwangi. Madurese are traditionally long-distance seafarers, though many are also farmers.
- The majority of Banyuwangi fishers are collectors, either on a part-time or permanent basis.
- A significant number are now totally dependent on the OFT, or nearly so.
- All are men, though women may be involved in preparations and post-harvest activities

c. General traits:

- Poorly organised and lack cohesion.
- Under-financed and poorly equipped
- Little formal education and extremely poor business management skills.
- Poor technical skills in the capture and post-harvest care of ornamental fish.
- Tendency to use destructive methods (easier and quicker, often also cheaper) including the illegal practice of cyanide fishing

IV.2. Others

- **Crew of (non-collecting) initial buyer ships:** e.g. buyer boats from Tumbak. These people are not the poorest of the poor, but their average income and general livelihood conditions do not allow them to rise out of a position where they often cannot afford proper access to basic services such as health and education, and depend heavily on the boat owner (patron-client relationship). Most do not have other activities, but as permanent crew, will be employed in whatever activities the boat owner organises.
- **Staff in holding facilities:** at all levels from financier to exporter, including packers, cleaners and others. At the exporter level, the fringe benefits (food and lodging, over-time, health care) are generally high, and mean that most of these people do not count as poor. However, at the financier level, both income and security/benefits are much lower, so that these workers are most often relatively poor. At intermediary levels, some staff may count as poor, depending on individual company practices.

IV. Market Chain

The details of local market chains for Banggai Kepulauan and Banyuwangi are summarised below

Collectors (local fishers)

Most of the collectors in Banyuwangi are local fishermen of the Madurese ethnic group, who have settled, sometimes already for several generations, in Banyuwangi. The majority of these collectors are tied to local Initial Buyers by family ties and/or through ties of debt, as these Iintial Buyers often also act

as Financiers. Because of these ties, fish caught by any one collector are generally sold only to one particular Initial Buyer.

Fish also come into Banyuwangi from outside collectors (fishers from other areas), including Bali, Jember, Situbondo, Madur and other Districts along the coast of East Java.

Fishing grounds of local collectors are generally determined on a seasonal basis. When weather conditions make collecting impossible in East Javanses and Balinese coastal waters, collecting takes place in Eastern Indonesia.

Collectors and small Initial Buyers usually receive working capital from larger Initial Buyers, Main Traders (larger buyers) or shop owners (ususally from the Surabaya area).

Initial Buyers (Pengumpul)

The Banyuwangi Initial Buyers an be divided into two main groups, small buyers, hereafter referred to as Local Initial Buyers, and larger businesses, hereafter referred to as Main Traders. Both groups frequently buy from both local (usuually tied) and outside (usually independent) collectors, many of whom come specially to Banyuwangi to sell their catch.

Independent buyers are the minority. However, tied buyers can sell their fish elsewhere if the financing business does not require them. Independent traders generally sell their fish based on orders from shop owners in Surabaya and Banyuwangi, or from larger traders in Banyuwangi. In some cases, fish are sold direct to Importers from Singapore who come to Banywangi to buy fish.

The smaller Local Initial Buyers are often also Collectors, and they can generally only sell directly to larger Main Traders or Local retailers, they do not have direct access to Exporters.

The larger Main Traders are also frequently tied by capital financing links to sepcific exporters or occasionally local retailers.

Local Retailers

Local retailers are spread from Banyuwangi, through Jember, Situbondo, Probolinggo, Pasuruan, Surabaya and to Jakarta. Sometimes they come directly to Banyuwangi in order to purchase fish, generally from small Local Initial Buyers, and in some cases, provide them with working capital.

Competition between these local retailers sometimes causes problems at the initial buyer level.

Exsporters

In Banyuwangi, several exporters provide finance/working capital and have holding facilities as well as buying fish. Some have formal branches in Banyuwangi, others have less formal links with local buyers or come for one-off purchases or orders. Most exporters have used the finance/debt links to bind suppliers to them, and these tied suppiers (usually Initial Buyers) are not then usually allowed to sell fish to other exporters or traders.

Most fish are exported via Bali and Jakarta, using land transport and flights from Surabaya.

Several exporters who buy in Banyuwangi don't have their own holding facilities. They act as brokers to supply other exporters, or indeed buy fish from other exporters (with holding facilities) which they sell directly overseas importers.

V. Livelihoods Analyses

As the main group of poor stakeholders identified was the OFC themselves, most information relates to and/or focuses on this group. However there is some information on the Tumbak buyer boat crew and the workers employed by traders who also arguably count as poor people involved in the trade and on other stakeholder groups.

V.1. Economic and Financial

V.1.1. Trends in the ornamental fish trade: seasonality and major events

Seasonality: this was an important issue for most collectors and their families. In addition to impacts on collection, seasonal variations (especially rainfall) in many cases greatly impact general well-being, e.g. lack of fresh water during drought months and high incidences of sickness (dysentery and malaria) during wet months.

- The main seasonal factor affecting collecting activity is market demand. In Banyuwangi, fluctuations in orders directly affected activity levels. In Banggai, the market demand at higher market chain levels results in fluctuations in the frequency of visits from buyers and in quantities required.

Other factors influencing seasonal levels of activity in the ornamental fish trade included:

- Other activities (e.g. grouper spawning periods, farming seasons)
- Climatic variations (especially related to the main monsoon seasons. For example the highest demand form the export market often coincides with inclement weather. January and February (the Northern Hemisphere winter, a time of high demand) is the season of strong North winds around the Banggai Archipelago, which make it hard for Tumbak boats to return, reducing number of visits and increasing mortality. January, February are also the main bad weather months for Banyuwangi collectors, with adverse conditions in July also.
- Religion plays a role, as Muslim collectors in Banyuwangi and (though to a lesser extent) in Bangkep, are reluctant to go to sea or cease collecting altogether during the fasting month of Ramadan.

Major events:

In the Banggai Archipelago, major events include the declaration of Banggai Kepulauan as an independent District in 1999, the earthquake in 2000, with different impact levels in different locations (near/far from the epicentre). Specific ornamental fish related changes include the start of the trade (1980s to around 2000 depending on areas) and the commencing of the KM Sinabung operations in January 2004.

Major events in Banyuwangi include the start of the ornamental fish trade in the 1950's, the development of regular international flights from Denpasar during the 1980's and major investment in 1995 by an export company (P.T. Bali Blue).

V.1.2. Income from the OFT:

The range of monthly incomes for various stakeholder groups is shown in Table 1.

Table 1 - Income from Ornamental Fish Collection and related activities

	Main Stake holder	Estimated Monthly Income in IDR
Banggai Kepulauan	Collector	300,000 - 1,500,000
Tumbak	Initial Buyer Boat Crew	200,000 - 1,500,000
	Initial Buyer	1,200,000 - 9,000,000
Banyuwangi	Financier	2,000,000 - 5,000,000
	Free dive Collectors (around 20 days fishing)	600,000 - 1,200,000
	Compressor Divers (around 15 -20 days fishing)	800,000 - 2,000,000
	Odd job wage worker	300,000 + Food
	Packers (twice a week)	200,000 - 400,000
	Food fishers using nets and ***tongkol***	300,000 - 600,000
Denpasar (+ overtime & full board)	Exporter Packer & Odd-Job Man	500,000 - 1,000,000
	Exporter Aquarium Cleaner	300,000 - 500,000
	Exporter Sorter	750,000 - 1,000,000

The higher limits identified in this table are rarely reached. From this table it can be seen that incomes of the poor stakeholders identified are not dissimilar. All are generally chronically indebted in one way or another. A few important points regarding specific groups are given below:

Banggai collectors: according to the FGD participants in all villages, income from OFC is now mainly used for education, to supplement diet - for example milk for the children, and for health care rather than for basics such as rice. However at the peak it was the main income for a number of families.

Banyuwangi Collectors: in general, the price received by the financier is divided as follows: 1/3 for the fish (to the collector), 1/3 for equipment and overheads, and 1/3 for the financier as his profit. For example, if the price to the Financier is IDR 3,000, the payment to the collector will be IDR 3,000.

Tumbak Initial Buyer Boat Crew: as in Tumbak in 1999, the system of profit-sharing is as follows: 50% after deduction of trip-related costs to the vessels owner, and 50% (probably the net profit referred to

in Bone Baru) shared among the crew members. One to three trips per month are usually made, depending on weather and market demand.

Exporter Employees: most receive free food and lodging, health care and other benefits and can earn over-time during night shifts. This means they have an effective salary at least double or even triple the cash figure. However they are vulnerable as should they loose their jobs (e.g. through the business closing) they are unlikely to have been able to make any sizeable provision (savings, investments), and their skills will not be easily transferred to another industry.

Higher Market Levels:

Clearly the financiers/Boat Owners make a better living, but as they have to cover maintenance and depreciation, are unlikely to make a fortune. Further up the chain no figures are available, but it is clear that income, at least for top people (owners, managers), increases dramatically.

IV.1.3. Financing of Ornamental Fish Collection

In Banggai:

The financing situation has changed, in that previous local buyer/financiers have pulled out. The people who used to run these businesses said they no longer found it profitable, mainly because of low margins/volumes compared to the risks: mortality and fishers not keeping their promises (e.g. selling directly to other buyers after borrowing from them).

Although income per fish has risen a little, in many ways life is harder, for example now only very small levels of credit can be had for buying basic items from the ***kios***, as there is no longer any security (rights over the catch) for the ***kios*** owner. Now the services of ***rentenir*** (loan sharks) are used more often. Often the only way to pay these debts off , i.e. to get a big lump sum, is by destructive fishing (DF), especially the use of explosives. So debt and DF are intimately linked. Most fishing families, including those involved in ornamental fishing, are never out of debt to them, or only for a few days at a time, according to ***kios*** owners. Some collectors borrow from the initial buyers, however this is generally not directly linked to collection activities.

In Banyuwangi:

The majority of ornamental fish collection is financed by the Financiers, though with an exporter having a branch in the area since 1995 and access to other buyers, some collectors are self-financed or at least partly financed by informal credit means similar to the Banggai collectors.

IV.2. Natural Resources and their Use

The extent and condition of the natural resource base is an important consideration, as sustainability is highly (ultimately) dependent on this factor. This aspect was studied as part of the Banggai Kepulauan Case Study, and included substantial bio-physical data collection.

IV.2.1. Banggai Collection sites, location and condition

Known harvesting areas are identified. Anecdotal information from a number of people met during the study and secondary data indicate that these are far from a complete set of ornamental fishing grounds in the Banggai Archipelago, especially if activities by non-local collectors are included. Indeed, although by no means all villages are involved in the OFT, it seems there are few coastal areas of the archipelago where ornamental fish are not caught, either regularly or occasionally, and that any unharvested areas remain so because they are not worth the effort or there is some other conflicting activity which prevents collecting (as in the case of the Pearl Farm) or makes collection unattractive or dangerous (as in Harbour areas) rather than because they are undiscovered. The main collection areas are coral reefs, both the reef flat (e.g. for BCF) and reef crest/slope (e.g. for ***letter six*** and ***piyama***).

In general the seagrass beds (habitat of some ornamental species) were seen to be in fairly good condition, and do not seem overly threatened as yet. Mangrove resources (nursery areas for some ornamental species) although not specifically studied during this survey, are under severe threat around all inhabited islands from use as firewood and are clearly far less extensive than was once the case.

Most ornamental fishing methods seen or reported can and often do result in considerable mechanical damage to the reef, especially where there are branching or other fragile coral life forms, such as foliose corals. It would seem that ornamental fishing is largely to blame for the high incidence of rubble and soft coral cover shown in the Bone Baru data for example, where unlike that seen in deeper water areas down the reef slope, the shallow-water reef damage was not typical of bomb fishing.

Major threats to the coral reefs of the Banggai Archipelago, the major habitat for most ornamental fish target species, are by no means limited to the effects of ornamental fishing, with or without cyanide, and those identified by the field study are listed in the report,

It is clear that conservation is necessary, and that the socialisation of some aspects at least needs to include Government, especially those involved in public works, as well as fishers and the general public.

IV.2.2. Condition of Ornamental Fish Resources (stocks)

Little data is available on the condition of fish stocks other than BCF (***Pterapogon kauderni***), though FGD revealed that all species targeted are harder to catch than when the trade first started. This indicates non-sustainable fishing levels. The team undertook a limited survey of ***Pterapogon kauderni*** (BCF) populations, the results of which are summarised in Appendix 1. Juveniles were defined as fish under 3.5 SL (Standard Length), the lowest recorded breeding size (Vagelli & Volpedo 2004, Kolm *pers. com.*), however most juveniles seen were well below this size, with very few fish between 2cm and 5cm SL being seen at heavily fished sites.

Both fish and *Diadema* urchins, the major symbiont of the species, were surveyed. The overall conclusion is that the stocks are under (sometimes severe) pressure but that with proper management, sustainable use at commercially viable levels is possible.

IV.2.3. Fishing Practices, Post-harvest handling and mortality

Poor Fishing Practices and Post-harvest Handling are common. The OFT buyers generally only accept fish in prime condition, without signs of physical damage (missing scales, damaged fins, wounds, etc). For some species size is also a consideration, and some species have requirements which can be hard to meet in captivity (e.g. special food, water quality etc). Rejected or dead fish mean the loss to the reef is also a financial loss. Mortality at whatever stage of the chain generally contributes to higher costs, low prices for the poorer people low in the trade chain, and to overfishing on the reef (Schmidt & Kuntzman 2005). Reduction of rejection and mortality levels are key points in achieving sustainability and seeking to improve the livelihoods of the collectors and other poor people involved (Rubec & Cruz 2005).

The current skill and equipment levels are particularly poor at the lower trade levels including specifically in Banggai Kepulauan fishing communities. In some cases, simple changes in immediate post-harvest handling procedures could significantly reduce rejection and improve survival. For example, with BCF, better on-site selection, releasing juveniles, larger mature adults and brooding males immediately after capture, would reduce both rejections and mortality significantly and is already practised by some collectors. Better care during ornamental fish holding is also an important issue, for example establishing and implementing suitable feeding regimes at village holding sites. More information is in Appendix 4.

IV.3. Other Sources of Income and who earns

The main non collection occupations of collectors in Banggai Kepulauan are listed in Table 3 by village.

Table 3 - Non OFT Livelihood Activities of Collectors and their Families

Village (main collector ethnic group)	Major local fishery products	Handicrafts Services & local crops	Other General occupations	Harvesting Protected Species	Main general crops	Main general fisheries
Bone Baru (Banggai)	Squid Dried salt fish	Mats & Roofing from Nipa leaves Vanilla	Processing and selling (mainly by women) of fishery products (fish, squid, teripang etc) Making and selling cakes and prepared food, Seasonal work on clove and other plantations (harvesting -	All 6 species of tridacna clams (mainly for the meat, local consumption), all turtle eggs found, hawksbill turtles (for the shell), green turtles (for the meat), dugong (for the teeth and sometimes other body parts including meat	Small-scale farming, including long-term (plantation) cash crops (coconut, clove, cocoa, cashew nut, some coffee and fruit) or staples (root vegetables, including cassava, sweet potatoes and the	Carangidae, Caesionidae, Scaridae, Serranidae, Haemulidae, Lethrinidae, Mullidae, Lutjanidae, Acanthuridae, Siganidae, sharks & rays most small pelagic species (sardines, mackerel, etc)
Tinakin Laut (Bajo)	Teripang Lobster Dried salt fish	General labour				
Monsongan (Bajo)	Teripang	Shop staff General labour				
Tolokibit (Banggai)	Abalone Squid Seaweed culture (men)	Farm work				
Panapat (Banggai)	Grouper spawning aggregations					

Toropot (Bajo)	Seaweed culture (family)	Sea transport	boys/men & processing - girls/women)	and skin), *Cheilinus undulatus* of illegal size.	endemic Ubi Banggai, maize and pulses)	and *Cheilinus undulatus* (napoleon wrasse)

In Banggai Kepulauan, it was clear that patterns were different depending on the ethnic group of the collector families. Bajo people had very few non-marine activities, and where they did have, these were usually very secondary, and gender divisions (almost absent in traditional Bajo lifestyle) though present were less marked, though they are increasing with the influence of "modern" life and education .

In the Banggai ethnic, men are almost all "amphibious", equally at home in marine and land-based activities whereas the women stay on land except for travelling, and these families often have farming as a main or important secondary occupation.

For fin-fish, capture methods include gill net (main method), hook and line and destructive methods (the use of explosives or poison). Cyanide-caught food fish are often not destined for the LRFT (Live Reef Fish Trade), but for local consumption (in Bone Baru or Banggai) as fresh fish, or dried for sale as dried salt fish. The fishermen are aware that the use of ***potas*** can damage the reef, but seem unaware of the hazards to human health from consuming freshly caught cyanide killed fish.

An average catch is 5 to 10 ***cucu*** and the average sale price is 5,000Rp, giving a gross income of 25,000 to 50,000Rp. Some fishing is done using garage forecourt type compressors for ***hookah*** diving, particularly for ***teripang*** (sea cucumbers) and sometimes lobster, diving accidents do happen. Fresh fish sale is facilitated in some villages by the availability of ice, produced in home freezers.

Seaweed farming is an important livelihood option in some villages, and could be extended, as most villages have suitable areas. However in general conditions are only suitable for part of the year.

Marine turtles are sold both to Bali and to locals, especially in some Christian villages. Muslims such as the Panapat fishers have religious rules which discourage the consumption of animals which spend part of their lives on land, part in the sea but unfortunately not their sale for consumption by others.

Salt is required in large quantities for the main squid and dried fish fisheries, and is mainly imported from Madura via Luwuk, there is no local salt production.

Most home improvements or large outlays are financed from seasonal activities such as the squid fishery, clove plantation work, etc.

Vanilla is a new crop. Increased use for thirsty vanilla plants has exacerbated the fresh water supply problem in some villages, with people and crops competing for limited water resources. All family members may be involved in the chore of watering.

When villagers, including ornamental fishers, do get large sums of money, they tend to waste it on luxuries or a few large items which are inappropriate, e.g. boats of a size and type which are not viable long-term because of routine operational costs and maintenance, rather than saving for a rainy day or investment in realistic means of production.

In Banyuwangi, other livelihood activities are mainly other fisheries and farming.

V.4 Health

V.4.1 Banggai Kepulauan:

Health is clearly an important part of overall livelihood conditions. Because of this, in Banggai Kepulauan information was sought not just in the villages but from the health-care providers, as it was clear that the official statistics were no longer accurate. Two main Government Services are involved, the Health Service (Dinas Kesehatan) and the Family Planning Unit (BKKBN - Badan Kordinasi Keluarga Berencana Nasional). The two work closely together. Both give health advice and the BKKBN keeps detailed records at the household and village levels.

The Health Service

Secondary data were way out of date as there have been many advances in health care provision. The District has been independent for 5 years, originally had little infrastructure and 80% (clinic and residential buildings, equipment, etc) was destroyed by the earthquake in 2000, the first year of independence. After the earthquake there was no aid for health care, only food and materials for rebuilding houses. There were very few staff, with only 3 doctors. In addition, being an archipelago poses many challenges. Therefore a step - by step capacity building plan was drawn up.

- **Physical Infrastructure:** for the first 2 years, 2001/2002, physical buildings were the first priority. By early 2003, the physical infrastructure was already 80-90% rebuilt as good or better than pre-

Earthquake. A new hospital is being built which will be the largest and most versatile in the Province outside Palu, should open during 2005 and will cover Maluku Utara as well as Banggai District. Four PUSKESMAS were upgraded to inpatient capacity in 2003: Banggai (Figure 60 and Appendix 2 - A2.4), Totikum, Salaka and Bulagi), and just recently Bungin (Bokan Kepulauan) was also upgraded.

- **Equipment and supplies:** In 2002/2003 there was also a PEMDA (local Government) programme for PUSKESMAS (main clinic) equipment and supplies.
- **Human Resources:** In 2003, a programme was started to improve the number and qualifications of personnel. This included employing 11 additional doctors, and now all 14 PUSKESMAS have a doctor (GP). Most PUSKESMAS are situated in Kecamatan capitals. Paramedical staff (70) have been recruited to cover the PUSKESMAS and POSYANDU (Puskesmas Pembantu) across the District. The programme aims to have a Bidan Desa (village nurse/midwife) in every village, so far nearly all have one but not all. Specialist Doctors for the hospital will be provided initially by UNSRAT (Universitas Sam Ratulangi) in Manado, with specialists in general surgery, obstetrics/gynaecology and anaesthetics. In 2005 further recruitment of nurses and other "paramedics" is planned. There is a programme subsidising and/or facilitating access to medical training for local youth with the hope that in 10 years time nearly all staff will be of local origin.
- **Access for all:** In 2005, a new programme starts under which all poor people will have health insurance from the state (Central Government), that is those who qualify as "pra-sejahtera". There is a time window for obtaining a "surat keterangan miskin" or certificate of being poor, from the village head (KD). PEMDA is setting a standard charge for an out-patient visit to the health services, including diagnosis and medicines, at only 5,000Rp, less than buying most medicines from the kios or going to the Dukun (medicine man/traditional healer) - a packet of cigarettes for the dukun costs around 7,000Rp. This is a very big subsidy, and will cost the government a lot.
- **Preventive Care:** There is a preventive medicine programme, especially for infectious diseases, malaria and "demam berdarah" a mosquito transmitted disease which is more often fatal than malaria. Hygiene is a main point in this programme, including "environmental health" which includes rubbish disposal and sanitation. Under this programme, people are given the materials to build septic tank toilet facilities, usually the actual toilet unit (squat/turkish type) and cement. Often in the past WC/washing areas have been built without installing proper water supplies so they are useless. This point was stressed also by the BKKBN as being a signal failure and sad waste of resources.
- **Malaria - a Major Problem:** Malaria is endemic almost everywhere, though there are hotspots. The coast is almost all high-risk, and it is feared there may be chloroquine resistant strains already in some places. The current anti-malaria programme has run for 6 years with no noticeable impact. This has included: (i)giving out preventive medicines (for weekly consumption): many people forget to take them, can't be bothered to collect them, or refuse to take them and (ii) insecticide sprays (large-scale): ineffective because only kills mosquitoes in and around the houses. Those in surrounding areas (marshes, woods, road side ditches, cultivated areas etc) just move in to replace the dead ones, usually takes a few days to return to previous levels. In addition, within the homes and villages many larvae survive because of poor hygiene and environmental health practices (uncovered water buts, wells, etc, puddles in refuse such as coconut shells, plastic/metal items etc, blocked drainage ditches, etc. The ex-program head feels that the most effective approach would be increasing people's awareness and understanding of how malaria is transmitted, why certain actions and habits will assist in reducing malaria - in terms of both numbers and severity of cases, and what actions to take in case of malaria symptoms appearing (proper treatment).
- **Other common diseases:** sickness and diarrhoea is common among all villagers including Collectors. Skin diseases (especially itching) and ear problems are frequent among collectors, but are accepted as part of the risks of earning a livelihood.
- **The Bidan Desa (village nurse/midwife):** usually lives in the village where she is posted and goes to people's homes, which could be why in the Venn diagrams she is seen as being close to the people. However in at least one village the Bidan Desa rarely visits the sub-village where the collectors live.

BKKBN - Family Planning Service

- **Role of the BKKBN:** The field staff from the BKKBN go to each household individually to collect data and to give advice, as well as sometimes holding meetings in village meeting places. Poverty Data based on BBKN standards (Appendix 2) and records is given in Figure 12. The Service provides information and advice on family planning to all ages, both sexes and all levels of society.

- **Policy:** There is no longer an "ideal" family, unlike the previous "***Orde Baru***" government (Suharto) which strongly advocated only two children. The accent is on giving people the means to make an informed choice, and the ability to plan their lives. Contraception must have the permission of both partners, usually the husband's consent as male contraception is rarely used.
- **Use of local volunteers:** In each village there is a family planning post, manned by 1 or 2 local people who have been given some training. These people work on a voluntary basis. The Service Head feels that it is these posts which are responsible for the high KB participation rate in Bangkep as a whole, though there are exceptions. The support of religious leaders has also been a success factor.

Water Supply and Sanitation:

Access to sufficient fresh water is still a major problem in almost all villages, especially in dry weather. Sanitation is still non-existent for most homes, and the government built MCK (combined washing and WC facilities) are often unused or even falling into disrepair without ever been used because of lack of water supply.

V.4.2. Banyuwangi: collecting carries a higher risk than food fish fishing, especially for pelagic species. Decompression sickness is frequent, often causing pain, burst lung or partial paralysis. But even after being affected they often still continue marine ornamental fishing. In Bangsring, at least one fisherman has died every year from diving-related sickness. The collectors face the risk alone because, as for most Indonesians, there is no insurance for them. Often the fishers do not know about the real risks of diving. If there is accident they believe it is because of supernatural forces. There is a lack of health facilities and health staff (numbers and qualifications) in the area with knowledge related to the risks of diving, including that practised by ornamental fishers. The collectors resort to traditional medicine, which is rarely effective.

V.5. Education

In both Banggai Kepulauan and Banyuwangi the educational level of collectors and their families is generally low. Some have not completed primary education. This is not unusual for coastal villagers, especially fishers, in Indonesia.

In Banggai Kepulauan, education, formal and non-formal, is seen by District Leaders as an essential component for development. The District started in 1999 with very limited educational facilities and a population with generally low standards of educational attainment. Now all villages have primary schools with close to 100% attendance for the primary school age-group. School attendance rates for the two survey Sub-Districts are shown in Figure 10 (from BPS 2004a & 2004b) and educational attainment levels of Household Heads for Banggai and Bokep Sub-Districts in Figure 11 (from BKKBN data)

In addition to regular formal education, in Bone Baru a new system has been started whereby poor children who have dropped out of school are taught in a less formal way, without school uniforms and other expenses which families cannot afford. This allows children to gain at least basic literacy and numeracy skills and if they wish, to progress to Middle School (STLP) certificate (examination) level. Non formal education is also run by various Government programmes, including the Fisheries Service, for example training in the running of small or sole-trader seaweed farming businesses.

Of particular relevance to OFC and other fishing families is the recent establishment of the Marine (Liang) and Fisheries (Banggai) High Schools. None of these has yet completed a full three-year cycle, but the Banggai Fisheries School will release it's first graduates in 2005. One of the two Banggai-based schools (both run by NGOs) functions as a go-between in the marketing chain, collecting fish or other marine produce from the villagers and bringing it to the companies. This arrangement is felt to benefit all parties, and the fees received are the main source of income for school expenses. The communities and companies involved see it as beneficial to them as well as to the school.

IV.6. Standards of living and wealth perception

Standards of living and wealth are subjective concepts, and there is still no absolute standard agreed by all, even within Indonesia. However, the most commonly used criteria in Indonesia are those set by the BKKBN (Appendix 2). In addition to this data, more subjective perceptions were defined together with the villagers in three sample villages, Bone Baru, Monsongan and Panapat.

Although collectors can give the cost of specific items none of them can give a true estimate of their "overheads". Other costs such as school fees, clothes, soap and other necessities as well as health care and other unpredictable expenses also have to be covered in order to provide a reasonable lifestyle. However

a rough calculation shows that even basic family necessities cannot be covered for under IDR 800,000 per month, less than the incomes of some collectors.

Some other general points include:

- **Access to free/reduced health services:** there are special programmes to enable the poorest people to access health care free or at very low cost. However, many people who qualify do not register, and many people who are poor in the eyes of most other people, do not qualify under the rules. Many people are ashamed to admit they are poor, or to go for treatment when they cannot pay. In addition, as throughout much of Sulawesi, there is a "false pride" syndrome, largely an effect of highly aggressive and successful brand marketing, of not wanting generic medicines (e.g. paracetamol) which are cheap or even free from the clinic, and preferring much more expensive (up to 10 times per dose) branded medicines (e.g. Paramex) from the ***kios***, even if they can't really afford them.
- The criteria can penalise people unfairly. For example, the family of one collector had a concrete brick house built as the only contribution ever made to the household, by his son-in-law. As a result, the family has no increase in income, but a "permanent" home means they and no longer qualify for most government assistance, such as the free/subsidised rice distribution programme (RASKIN). This is not an isolated case, there are many people struggling to raise a family who find themselves worse off when they raise themselves up a little in one respect, without becoming rich enough to be self-sufficient.
- Corruption has become a part of life at all levels, from workers feeling it is "normal" to take home materials for themselves or their families, to officials and contractors who feel it is their right to take percentage cuts from project money, or who expect bribes in order to expedite what should be their normal work, such as producing routine letters. The new National Government has made a strong policy statement on KKN (corruption, collusion and nepotism), and the District Government officials also stated they are trying hard to reduce KKN, but it will be a long time before such deeply entrenched habits are eradicated.

It is interesting to note that poor health and education are seen as a sign of poverty, and that in two out of three villages, a Television was the first item mentioned as showing someone was not poor. Poor people are seen as being more likely to break the law, especially petty thieving. The main targets are cloves and coconuts.

IV.7. Gender Aspects

In the Banggai Kepulauan, gender roles depend quite heavily on the ethnic group of OFC families, as already mentioned.

Banggai Ethnic group:

Women rarely work outside the home, most could be described as housewives or "homemakers". However the roles they play in the village outside the home include:

- Some women take part in farming activities, including seasonal crops and long-term plantation care, though mostly only part-time or seasonally. This may be on their own/family land or as workers paid by the day or on a piece-rate basis.
- Many take part in the women's group, PKK, including the weekly meetings which are held for reciting of the Holy Koran.
- Women work together for big events such as weddings, deaths etc.

Bajo Ethnic Group:

Many women in Bajo fisher families take part in fisheries related activities including capture fisheries, as in the traditional Bajo lifestyle, but are now also expected to full-fill the role of "housewife", now life is no longer lived on a boat but in settled homes, even if many are still over the sea and with few modern amenities.

- Most ***Padola*** (food fish sellers) are women (Figure 13)
- Women frequently participate in OFC, generally with their husbands and other family members
- There is no fixed gender demarcation for almost all tasks within Bajo households
- One of the OFC local financier/collectors was a woman

However the trend in Bajo society, once a society where gender had little influence on social roles and livelihood activities, is becoming more differentiated. This trend began when Bajo people started to settle in villages rather than roaming the seas, living on boats from birth to death. All Bajo children learn to swim early, often before they can walk (Figure 14), and to fish as soon as they can hold a small rod and line or mini spear. Traditional Bajo leaders consisted of elders who were either men or women, chosen for their aptitude by their predecessors and trained to take over the specific roles.

This social order has all but disappeared, as under the Suharto regime it was suppressed for over 30 years. Now in most Bajo groups the traditional knowledge of the elders has been lost or is little valued.

The patriarchal nature of Indonesian Beaurocracy has reinforced the dominance of men in many social areas, because the family head or KK (Kepala Keluarga) is the senior man in a household, unless there is no adult male to take on this role. All aid programmes go to the KK, and the KK has to deal with most administrative business on behalf of the family.

Modern ideas of fashion and beauty are also playing a role. Traditionally young Bajo girls and women would have gone to sea along with their male counterparts, and earned a similar living, thereby having financial independence. A desirable mate in traditional society was a good fisherman or fisherwoman

Now girls feel they have to guard their complexions, to comply with the heavily advertised canons of "white (or at least pale) is beautiful" used to sell branded skin creams, soaps etc. Most are reluctant to go to sea, and although many older women still sell fish, many younger girls and women, quite capable of helping, are no longer willing to do so, and dream of working in a shop, or becoming housewives, by attracting a man well off enough to be able to provide for them.

Many girls marry young, often marriage rather than lack of money for schooling is the reason for girls dropping out of education (Figure 15, whereas for boys it is more likely to be a chance of earning money.

Women often have little say in how money is used when they do not earn it. Without education, women find it hard to make a living, even more so than men who can do quite well-paid unskilled work. Marriage as a way to securing a livelihood is not necessarily a safe option.

IV.8. Social Structure (Social Capital)

Three aspects are covered, social relationships within the communities where OFC live, the administrative and legislative structure under which those communities function, and the framework of rules and regulations by which the OFT and the communities should abide.

IV.8.1. Social relationships

Traditional social structures such as "***gotong royong***" are still very strong, and can be seen in the spirit of mutual help which pervades the village life, and is called on for organising communal tasks such as building/renovation/maintenance of religious and other public facilities, as well as the building of private houses. Social relationships were explored through the construction of Venn diagrams in three villages, (Appendix 3). While there were difference, several general points of importance were similar, and are relevant to all villages visited:

- **Village Head & BPD:** the role of the Village Head is very important. Even when seen as "distant", he is seen as a key influence in people's lives. This is based on the traditional respect and the character and actions of the individuals involved more than a perception of the full potential role of the Village Head. Village Heads together with the elected BPD have considerable powers under OD - Regional Autonomy - including legislative as well as executive powers.
- **Lack of Outside Players:** in all villages, no outside organisations or individuals are seen as having a major role, not even the Fisheries service, which in a fishing community should be seen as a key resource. The villages are still relatively isolated, with if any few higher level (above village level) Government, NGO or private sector institutions having a major direct or perceived influence on people's lives.
- **Health, Education and Religion:** though the order of perceived importance varied (seemingly based mainly on the capacity and personality of the individuals representing these aspects), they were perceived as important by all communities, except in Monsongan the Imam/religion was not mentioned.
- **Official Community Organisations:** the official women's and youth groups (PKK and Karang Taruna) were of minor importance in OFC families lives, and seemingly in the villages generally.

Once again this seems to be down to personalities as much as the actual structure. If they were taken over by really energetic and charismatic people with ideas that fired people's imaginations, they would probably become real community assets.

IV.8.2. Administrative & Legislative Structure

The key administrative structures are identified. Note that a village (Desa) has an elected village head and village assembly, whereas a Keluruhan (suburb) in a town only has a Lurah, who is an appointed carer civil servant. The levels with elected assemblies with legislative powers are shown in Figure 17, together with territorial limits of jurisdiction on land and at sea (at the time of the survey).

Current Regulatory Framework

The current regulatory framework is outlined, but does not claim to be a complete description or listing of the regulatory framework in place, merely an overview of key points of relevance to the OFT, as they should operate according to key informants. One basic principle of law is that no legislation may conflict with legislation passed at a higher level. Therefore all local laws have to be in accordance with national laws, and local laws at higher levels. In theory national laws should comply with International laws and treaties to which Indonesia is a signatory.

The national legislation includes laws banning most destructive fishing practices, and as Indonesia is a signatory to the Biodiversity Treaty and Agenda 21, the CITES agreements and other International treaties regarding sustainable resource use of natural resources and conservation (RAMSAR, the Kyoto Protocol etc), all levels of legislation must comply also with the provisions of these treaties. In practice most of these regulations/systems are not (yet) applied. An indication of the state of compliance for Banggai Kepulauan is provided.

VI. INFLUENCE

VI.1 Positive Influence:

a. Additional source of income. The development of the ornamental fish business has opened an additional livelihood opportunity for fishermen (as collectors), which can be a source of valuable additional cash income or even become a full-time occupation. Collectors in Banggai Kepulauan and Banyuwangi can increase their earnings by 25-100% compared to the days before ornamental fish collection started.

b. Business and employment opportunity. Ornamental fish trading in Indonesia has opened a business opportunity, especially in cities and towns such Denpasar, Banyuwangi, Manado, Palu, Surabaya, Makassar, Kendari dan Jakarta, which in turn creates new employment opportunities (as packers, screeners, cleaners, etc*)* and increases local Government revenue.

c. Changing perception. Increased knowledge of collectors regarding the economic potential of coral reefs can change their attitude towards this valuable resource, including increased protectiveness. Local collectors tend to protect their fishing grounds form destructive fishing by others, both local and especially outside (non-local) fishers, whether of ornamental or food fish. Awareness of the value of the ornamental fish trade at the local Government level can give impetus to the creation of local policy and regulations for the management and (sustainable) exploitation of the coral reef ecosystem-based resources in their area.

d. International awareness. There is an increase in understanding and caring about Indonesian coral reef conservation by buyer Nations in Europe and America. One practical outcome of this is the International Community's support for the development of standards for sustainable trading of ornamental fish (certification). The impact of this on poor stakeholder livelihoods can be either positive or negative, depending on how certification or other interventions are designed and implemented. For example, there is a risk of poorer stakeholders being unable to comply, or being pressured into reduced income by higher level players to recoup costs. But if well implemented could give poor stakeholders the chance of greater involvement and of a sustainable income, whereas the current situation is clearly unsustainable, which sooner or later will result in loss of livelihood opportunities.

VI.2. Negative

a. Resource degradation. The ornamental fish trade in Indonesia suffers from degradation of the resource base by others, but also causes degradation of the very resource on which it depends, the coral reef ecosystem. There are two main types:

- **Destructive fishing:** with little technical knowledge regarding proper capture techniques, many collectors resort to the use of destructive practices. The best known is the use of poisonous substances, especially cyanide. These substances not only result in high mortality of target fish, but also kill many non-target organisms, fish and invertebrates, including coral. Collecting often involves both accidental (e.g. trampling) and purposeful (with tools such as oars or crowbars and by hand) damage to the framework of the substrate, especially breakage of corals.
- **Over fishing:** Driven by high demand levels, unreliability of orders, uncertain buyer schedules, and desire to maximise (individual) returns, collectors tend to catch more fish than can be harvested sustainably/ Often target species populations are not given time to recover (breed) between fishing events. One factor which affects the level of over fishing is the (often high) rate of mortality at all levels of the market chain.

b. Unfair Trading. Trading in the ornamental fish market chain within Indonesia is often unfair and poorly organised. Two particular points are:

- There is a process of creating or maintaining poverty at the collector level, whereby collectors are kept dependent upon the buyers, even where the initial buyers are not the financiers, for example in Banggai the payments are often delayed (not paid in cash at the time of sale), frequently in breach of the buyer's initial promises.
- The collectors have little opportunity for bargaining, the price is fixed by the buyers. As a result for example, prices paid per fish for most species to collectors in both Banggai Kepulauan and Banyuwangi, and prices to Initial Buyers in Tumbak, have hardly increased since 2000/2001 and have not kept pace with the rise in cost of living.

c. Potential for conflict. There is considerable potential for conflict directly related to ornamental fish collection and trading, though so far violence has only rarely occurred. There are three main types of conflict:

- Horizontal conflict between collectors: fishing ground conflicts arise between local collectors, between local collectors and collectors from other areas, and between groups of non-local collectors operating on the same collecting area.
- There is conflict over (including spatial) resource use/access between collectors and other sectors, for example tourism (e.g. in Bali), and other fisheries activities (e.g. pearl farming and sea-weed farming in Banggai Kepulauan).
- Conflict occurs between buyers and collectors (related to unfair trading and to the "coupling" of areas) and the competition between buyers is sometimes close to conflict (e.g. between Balinese and Tumbak buyers in parts of Banggai Kepulauan).

d. Opportunity for Corruption. Weaknesses in the basic legal framework and the implementation of regulations, especially regulations relating to the use of poisonous substances for the capture of fish (including ornamental fish) are often exploited by the fishermen who indulge in these practices. This opens many opportunities for bribery, corruption, extortion and protection racketeering, especially by officials at all levels. One effect is to significantly increase "overheads" and make ornamental fish trading less profitable than it should be.

e. Health Impacts on collectors. Diving activities (breath-hold and even more so compressor- assisted) which are an integral part of ornamental fish collecting carry a high risk of accidental injury, both pressure-related (E;G. burst lung, decompression sickness or the "bends", damaged eardrums) and other (e.g. propeller injuries) which are sometimes fatal. During the past 10 years, 25 collectors have died of diving-related injuries in Banyuwangi.

VII. Recommendations

1. Specific recommendation to all stakeholders, which needs concerted effort: Increase the Organisational Capacity of Collectors (fishers), in particular via the following:

   (i) Form and develop collector groups/organisations, preferably with tiered structure from village or sub-village level (collectors from and working the same area, everyday management issues) to Sub-District and District Level (for representation in trade/marketing negotiations, legal issues,

participation in policy and planning at District level and above etc) and eventually possibly up to National level (for addressing common issues and mutual support).

(ii) Capacity building for members in:
- Management skills (organisational and business)
- Best practices in the capture and post-harvest treatment of ornamental fish,
- Where appropriate introduce breeding of certain species and technology/practices designed to replenish stocks and/or restore habitat
- Resource management, including fishing ground management (ensure the collectors have a role/stake in the management of their fishing areas) - as part of a wider community/collaborative nearshore marine resource management system (e.g. based on the LMMA - Locally Managed Marine Area - concept)

(iii) Open up access to capital (private sector and Government, e.g. BPD and/or support programmes) and develop systems for "self-help" based on the STREAM model

(iv) Improve market access (clear and simple procedures, well publicised, access to market/trade information for example via tiered structure above, access to proper transport/packing equipment, find an alternative to the "Mafia" syndrome)

2. Exporters: in general exporters (and major buyers) should give greater support to lower trade levels, in particular:
- Follow best practices to international standards and work towards certification
- Assist in capacity building of collectors groups, particularly in their source areas/collectors who supply to them (directly or via intermediate trade levels)
- Transfer appropriate technology to collector groups
- Better communication with collectors regarding appropriate species and orders to avoid collection of species with overly high mortality rates, low demand etc.
- Be aware of capture methods, publicise acceptable methods widely to all lower trade levels and truly endeavour to purchase only fish caught in a responsible, sustainable manner

3. Government: all levels of Government, from village to National, legislative and executive, should play key roles, in particular:

(i) The Marine and Fisheries Department/Services (DKP) specifically:
- Improve the standard of public outreach
  - Infrastructure and equipment - e.g. communications (radio), vessels
  - Human Resources, in some cases increased personnel (e.g. in Banggai only 1 surveillance officer), increase specific skills relevant to the OFT in order to have outreach/extension capacity in this area
  - Have clear and well-publicised procedures for necessary permits and regulatory functions
  - Keep up to date on technical aspects, best practices, etc and make information available to stakeholders, including fishers (collectors)

(ii) DKP in partnership with other GOs, especially Department of trade and Industry, but also several other GOs:
- Assist in the process of building organisational capacity (collectors)
- Facilitate marketing/promotion by ornamental fish businesses (exporters and in-country) and collector groups both at national and international level (e.g. presence at trade shows and other commercial events, participation/ representation in relevant policy making events and processes, etc)
- Support the development and implementation of certification, as a tool for reforming the system, and as a key participant
- Clarify, socialise, where necessary improve and implement regulations; establish some form of price regulation (guides/range/minimum) with review system
- Put their own house in order, including improved transparency and clarity, improvements in data collection and record keeping, building programs based on real data, and improved internal and cross-sectoral communication and synergy

(iii) Legislation: use the powers granted under Regional Autonomy especially at Village and District levels to produce regulations/legislation appropriate to local circumstances - implemented by legislative bodies but supported by GOs, NGOs, Academia and legal experts, and involving participation of relevant stakeholders and communities. Will require capacity building for local legislators (BPD, DPRD).

- PERDES, especially to empower communities to manage their (marine/coastal) resources (e.g. to empower local wardens - kelompok Wasmas)
- PERDES/PERDA specifically related to the OFT, possibly including organisational aspects, and addressing the mechanisms for contributions to the local government and communities, licensing etc and relating to marine nearshore coastal resources management more generally

NGOs: as independent organisations, NGOs at all levels, local, national and International, can make valuable contributions, and work with all other stakeholders.

1. Act as partners with Government, Collector Groups, local communities and other stakeholders, especially in capacity building of Collector Groups (organisational capacity and other)
2. Bridge the communication gap between GOs and fishers/collector communities
3. Assist with data collection/analysis/management, make suggestions, undertake monitoring and evaluation (watchdog), technical assistance (provision/transfer of specific expertise), etc.
4. Provide or seek funding and/or other assistance for specific programmes/projects and/or become implementers or co-ordinators.

Academia: can play an important supporting role, through research, including adaptive research and application; technology/skill/knowledge transfer (to GO, NGO, Collectors, students, private sector, etc); seeking and socialising up to date information/data, etc

EU: support for a Model (Pilot) Programme, implementation of recommendations which are applicable at a chosen site, to be selected based on survey results. The STREAM, hub could co-ordinate the programme, which should be multi-stakeholder, and address a wide range of issues, including livelihoods, organisational capacity and gender issues, market chain, technical aspects of capture, treatment and holding, resource conservation/sustainability, local regulations, developing local curriculum, etc. Specific aspects of the programme would include working towards certification and application/adaptation of the self-help group concept for the first time in Indonesia, starting with visit by local collectors to a successful self-help group (i.e. in another country with similar original situation).

Collectors: Need to be united, as individuals they have a very weak position.

- When there are opportunities such as GO or NGO programs, collectors need to be seriously involved, not just take advantage of temporary advantages or "perks", and make sure the right people (able and trustworthy) are selected to represent them.
- Need to be pro-active and make opportunities, not only hope for "handouts"
- Need to think long-term

Multi-stakeholder:

(i) Muatan lokal: all levels of schooling have an obligatory local curriculum slot, which is intended to allow children to be taught about their area, it's environment, traditions etc. There is no material as yet produced for many areas, including the Banggai Survey area. However this is an excellent opportunity to influence and inform the next generation about the marine and coastal environment, especially issues relevant to their areas, at ages 7 to 18. For Primary levels, almost all children, even from poor families, would be involved, and could then influence and inform their families. At higher levels, many children will be future leaders and decision makers, at least at local levels. Although the majority of schools are State run, and Government support is essential, most local Governments do not have the human or other resources, so involvement of other stakeholders, e.g. NGOs, Academia, Private Sector and funding sources such as the EU will be vital, for curriculum development, teacher training, production of materials, etc.

(ii) Social insurance/security: it is very hard to define poverty and to decide how many collectors or other community members are poor. However, almost all collectors and people in their communities are "vulnerable", that is to say that while they may have enough to live on day-to-day, they have no savings or insufficient to cope with any unexpected expense. The most

common vulnerability is to health problems - treatment of even relatively minor, or especially serious illness of a family member can reduce almost any family to poverty, with onerous debts. Improving awareness of and access to existing health care assistance, and creating some form of social insurance for families who do not qualify for existing assistance could help in reducing vulnerability. There are many potential options, involving GOs, NGOs, funding agencies, self-help from within the community, private sector, etc.

(iii) Work with/through Religious Leaders: in coastal communities, the most respected local figure is often the religious leader. In Bali for instance, working through Hindu religious leaders has been arguably the most effective intervention in reducing the slaughter of sea turtles. A similar approach, using the prescriptions of the local religion which enjoin wise stewardship of the environment (creation) and training of local religious leaders in putting across these principles, is likely to be a powerful support to other measures aiming at sustainable resource use. The Department and Services of Religion, NGOs and others could be involved.

1. Introduction

1.1 Background

Programme Background:

The EC-PREP[1]-supported project "International Seafood Trade: Supporting Sustainable Livelihoods Among Poor Aquatic Resource Users in Asia (EP/R03/014)" was scheduled to run from October 2003 through March 2005. EC-PREP is a program of research funded by the UK Department for International Development (DFID) with the main objective of enhancing the poverty impact of the European Community's development assistance and contributing to achieving the International Development Target of halving the number of people living in extreme poverty by 2015.

The Network of Aquaculture Centres in Asia-Pacific (NACA) and its STREAM Initiative in Asia, and Poseidon (UK) in Europe, implement the EC-PREP project, in partnership with stakeholders in the seafood and marine ornamental fish trade in Asia and Europe.

The overall goal of the EC-PREP project is international seafood trade that contributes to poverty reduction. The purpose is to identify options that improve the effectiveness of poverty reduction in the international seafood trade. The expected *outputs* from the EC-PREP project are:

1. A background review paper of the international seafood trade and poverty
2. Understanding of relations between poor people's livelihoods and the seafood trade through three field-based case studies in Vietnam (on shrimp culture), the Philippines and Indonesia (both on reef fish/marine ornamental fish)
3. Options for poverty reduction in the international seafood trade identified, and
4. Pro-poor seafood trade options communicated widely to public and private sectors.

As issues surrounding the seafood trade are large and complex, after the initial background review of the seafood trade and poverty (output 1), the project decided to focus on case studies of two important internationally-traded commodities, shrimp and reef fish species. The draft background review has been completed and is available for download on the NACA web site (http://www.enaca.org/modules/mydownloads/viewcat.php?cid=106).

Output 2 of the ECPREP project logframe refers to 'Understanding of relations between poor people's livelihoods and seafood trade'. This understanding is to be provided through three field-based case studies in three countries (Vietnam, the Philippines and Indonesia), working directly with poor people involved with, or otherwise affected by, the seafood trade. Case studies are intended to identify the stakeholders, livelihoods of poor people involved in supply chains, production systems and post harvest market chains, and those indirectly affected by the seafood production and trade.

[1] European Community – Poverty Reduction Effectiveness Programme

Indonesia Case Study Background:

The Indonesia case study was focused on the ornamental fish section of the seafood market chain and its relation to poor people's livelihoods, similar to the Philippines study.

The first step in the implementation of the case study was a workshop (Figure 1), held from 24th to 26th August 2004, Sari Segara Resort Hotel, Denpasar, Bali, Indonesia. Representatives of Indonesian organisations with the potential to become implementing partners and international resource persons attended this meeting organised by STREAM Indonesia, which was facilitated by NACA and the Directorate General of Aquaculture (NACA focal point). A list of participants and the workplan for this workshop are given in Appendix 1. At the meeting the following steps were completed:

1. Selection of Case Study sites: Sulawesi (Banggai Archipelago) and Bali/Java (Denpasar/Banyu Wangi), as described in Chapter 2.
2. Selection of Case study implementing partners:

   Two local NGOs with appropriate experience were selected:
   - Yayasan Palu Hijau (YPH) for the Sulawesi Case Study
   - Yayasan Bahtera Nusantara (YBN) for the Bali/Java Case Study

   Key project implementing personnel were also selected:
   - Ir Samliok Ndobe M.Si as Team Leader for the YPH Sulawesi Study, assisted by Abigail Moore MSc and Drs Akhdary Dj Supu
   - Arsonetri as Team Leader for the YBN Bali/Java Study, assisted by Indrawati and???
   - Aniza Suspita S.Pi from STREAM Indonesia as Indonesia Co-ordinator responsible for communication with the regional STREAM-NACA office on the progress and implementation of the study
3. Training/orientation of key partner team members to undertake market chain and livelihood analyses. This was carried out through sharing of experiences with teams from Vietnam, Cambodia and Philippines and a data-gathering exercise at CV Dinar, an ornamental fish exporting company in Denpasar.
4. Selected documentation and tools available from NACA-STREAM including that emerging from a "livelihoods workshop-series" in Cambodia and Vietnam, carried out in pre-STREAM 2001 by NACA with DFID support and documentation arising from the NACA-STREAM-implemented project "Assistance in Poverty Alleviation through Improved Aquatic Resources Management in Asia-Pacific" (FAO TCP/RAS/2908) were made available to both local case study teams.
5. Draft case study plans produced (with timetables and budgets) as a basis for contracts between NACA and implementing partners. These were later fine-tuned and contracts exchanged by mid-September.

Based on experiences in Vietnam and the Philippines, the following six-step process emerged from the market chain and livelihoods analysis, and was used as a guide in the design and implementation of the Indonesian case study.

The following 6 steps were agreed as a basis for the case study process:
Step 1: Stakeholder Identification
Step 2: Preparation for Stakeholder Investigation and Understanding
Step 3: Understanding of Stakeholders
Step 4: Livelihoods Analysis
Step 5: Market Chain Diagram Revision
Step 6: Feedback and Recommendations
More detail on the methods used in completing these 6 steps is given in 3.2. and 4.2. (Methods).

Background Presentation

Discussions and Planning

Applying Training - with Managers and Employees at CV Dinar

The Venue - Sari Segara

Figure 1 - Preparation Workshop in Bali[2]

1.2 Objectives

The four main objectives of the Indonesian Case Study were agreed as:

1. Understanding market chains

An overview of the market chain from Indonesian reefs to international retail, with greater detail for case study sites.

2. Identifying poor people in the market chains

Including people involved in the chain of custody and others who may be indirectly involved or impacted

3. Understanding the influence of the marine ornamentals trade on the livelihoods of poor people

The case study should specifically look for underlying as well as obvious factors contributing to poverty reduction, and identify examples of 'better practice' for poverty reduction in the marine ornamentals trade, including examples of positive livelihood outcomes from participation of poor people.

4. Identifying recommendations to improve poor people's livelihoods.

A draft list of potential intervention mechanisms has been drawn up by the EC-PREP team. Based on case study results, comment on the usefulness and appropriateness of each in the Indonesian context in terms of: likely effectiveness, likely results (positive/negative), feasibility of implementation, acceptability to various stakeholders, likely cost levels and risks. In addition, provide other recommendations (general and specific) based on findings and experience.

[2] Photographs in the left and centre columns by Elisabeth Gonzales; photographs in the right hand column by YPH. All other photos in the Sulawesi team report are by YPH unless the photographer is specifically mentioned.

2. Selection of Case Study Areas

Selecting representative areas over a country the size of Indonesia is not an easy task, so the selection was done at two scales, first selecting two representative areas and secondly selecting survey sites within these areas.

The two general areas for the case studies were decided at the preparatory workshop in Bali. Based on secondary data available and the expert knowledge of people attending the meeting, two areas were selected. The rationale behind this choice was that the resulting data should give a good picture of many facets of the diverse Indonesian ornamental fish trade, which covers many different natural and human environments over a huge spatial scale.

The first area was in Sulawesi, which is known to be one of the main source areas for ornamental fish, but with no major buyers or exporters. Within Sulawesi, the Banggai Archipelago was chosen as there is trade in many ornamental species from this area, including trade in the Banggai Cardinalfish, ***Pterapogon kauderni***, an endemic species, for which there was a reasonable level of secondary data available.

For example, data from the GMAD[3] database run by the WCMC[4] (active from 1997 to partway through 2002) shows the European Union (EU) as a major importer of fish from the Banggai region, in particular for *Pterapogon kauderni*, as shown in Figure 2a. The data in GMAD was voluntarily submitted by certain traders and is not a complete picture of the trade at this time, however it is significant that EU countries (and Eastern European countries some of which have since joined the EU) were major destinations in 2001 at the height of the GMAD data collection activity. The internet sites revealed retail prices generally in excess of 18US$ per fish for this species, a big gap with the maximum in-country price (at the exporter level) of 6,000Rp or less - around 0.7US$ at current exchange rates.

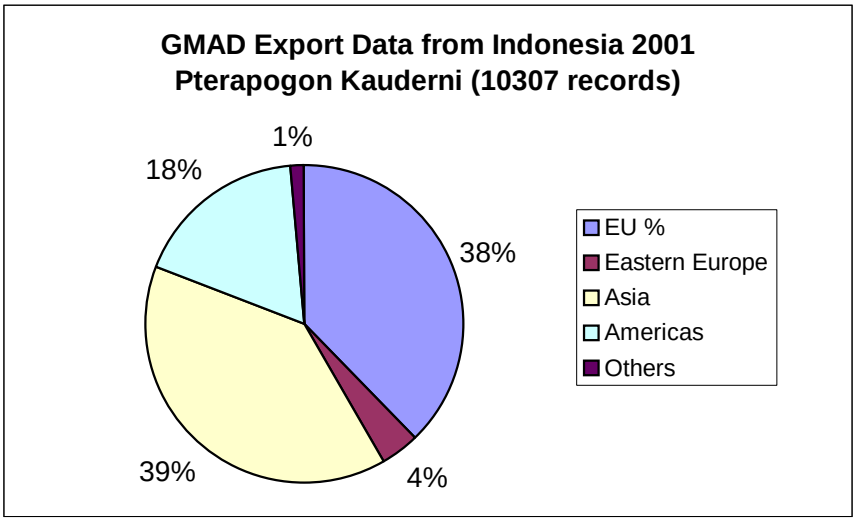


Fig 2a GMAD Trade data for Pterapogon kauderni in 2001

The second area was the East Java/Bali area, which is an area with many ornamental fish collectors, traders and exporters but fewer local fishery resources. The selected location in East Java was Banyu-Wangi, a major centre of ornamental fishing, and Denpasar, Provincial Capital of Bali, with several major trading companies and an international airport.

The two case study areas are highlighted on the map in Figure 2b.

[3] Global Marine Aquarium Database, http://www.unep-wcmc.org/marine/GMAD

[4] World Conservation Monitoring Centre, Cambridge, UK

Figure 2b - Indonesia Case Study Areas

3. Sulawesi Case Study - Banggai Kepulauan (Bangkep)

3.1. Methods

3.1.1 Secondary Data

Data were sought through the internet, using email to contact known sources and internet search techniques to find particular types of information. In particular data on specific species (especially the Banggai Cardinalfish *Pterapogon kauderni*), international trade data, certification data, information on relevant programmes and organisations, reports from previous surveys and relevant scientific research, etc. Statistical and other data were obtained from Government Departments by going to the relevant offices and requesting information. The information/data from the Badan Pusat Statisik (BPS) was available for sale in book form. Other data was provided as printouts, photocopies or through direct communication (speaking and writing).

3.1.2 Livelihoods Primary Data

Livelihoods data was collected and analysed largely through methods described at the workshop and in the materials provided through STREAM (Anonymous 2001 and Anonymous 2002).

Wealth Ranking in FGD

Seasonal Calendar in FGD

Use of Map in FGD

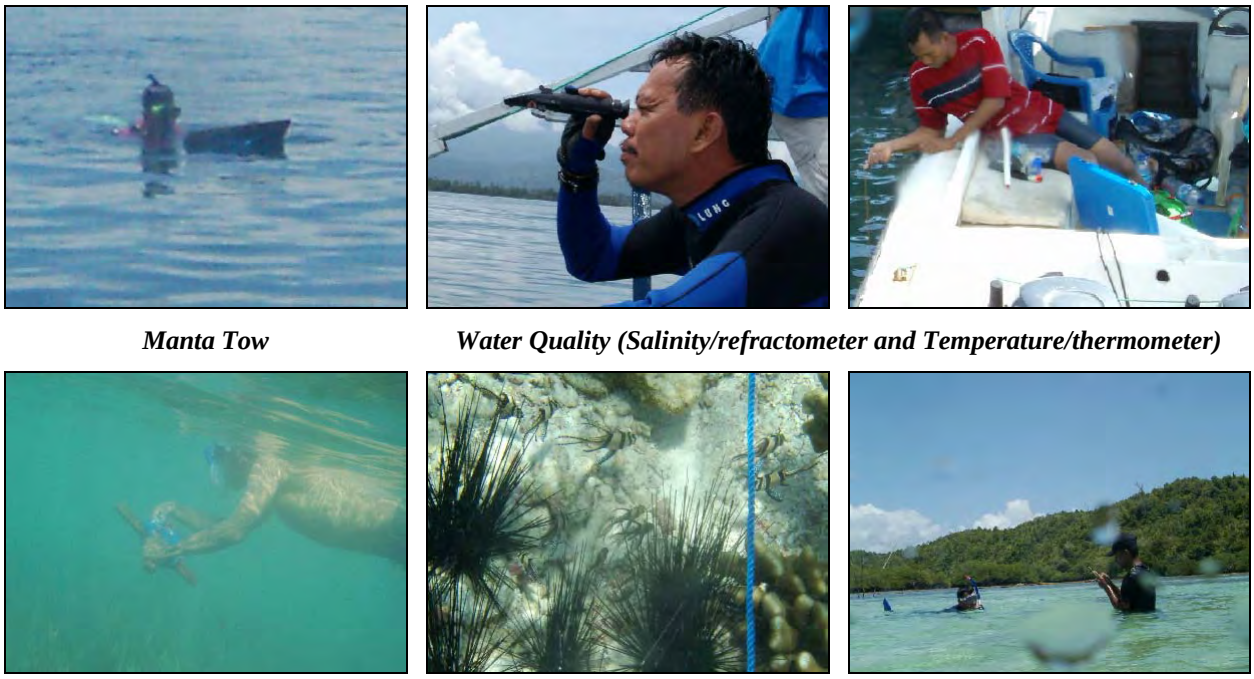
Key Informant Interviews (Gender Issues, Village Leaders, Government Officials)

Figure 3: Livelihood Data Collection

For the Sulawesi Case Study, the main tools used were: Focus Group Discussions (FGD), Key Informant (KI) Interviews, Wealth ranking Venn Diagramme, and Seasonal Calendar. A significant proportion of information was obtained from direct observation and through casual or every day interaction with people in the case study area. Additional information was gained through involving local people in activities, as guides or requesting demonstrations of specific techniques. Illustrations of some of these methods in practice are given in Figure 3 and in Appendix 2 (A2.6).

3.1.3 Biophysical Primary Data

Biophysical data was collected to support the livelihoods data and provide a foundation for making sound recommendations for sustainable fishery/trade activities. The data mainly relate to the Banggai Cardinal Fish (BCF), the main species collected by local Banggai fishers, and consisted of two main types, habitat condition (substrate data and water quality) and BCF population data. Illustrations of some of these methods in practice are given in Figure 4, Appendix 2 (A2.6) and Appendix 3.



Manta Tow | *Water Quality (Salinity/refractometer and Temperature/thermometer)*

Transect for BCF/Substrate (setting and transect in place) | *Swim Survey*

Figure 4 - Biophysical Survey Methods in Practice

The biophysical survey methods used are described in more detail in Appendix 3, together with survey results. However a brief description follows.

Substrate Data:

The aim of the substrate survey is to determine the composition of the substrate (sea bed), and the condition of the dominant ecosystem (usually coral reef), including any damage or visible sources of degradation. During the survey two standard (GCRMN) methods were used: manta tow (English et al 1997) and a form of line intercept transect.

Manta tow technique consists of towing an observer behind a slow-moving boat and making notes at regular intervals. The resulting data consists of substrate composition using 6 categories and (for coral reef areas) coral reef condition using 5 categories. These categories are given in Table 1 below.

Line Intercept technique consists of placing a line on the sea bed, and noting the composition immediately below the line at regular intervals. The resulting data consists of substrate

composition and of coral reef condition, which has been analysed using the same 5 categories as above. The composition data collected used the GCRMN life-form categories (English et al 1997) which consist of biotic substrate categories which are illustrated in Figure 5 and abiotic substrate categories (dead coral in various states, sand, silt, etc). These categories can be grouped to give data in the same 6 data categories as the manta tow data for comparison purposes.

Table 1 - GCRMN Condition Categories and Manta Tow Composition Categories

Condition	% hard coral cover	0 - 10%	11 - 30%	31 - 50%	51 - 75%	76 - 100%
	category	Very Poor	Poor	Average	Good	Very Good
Composition	Hard Coral	Soft Coral	Other	Dead Coral	Rubble	Sand

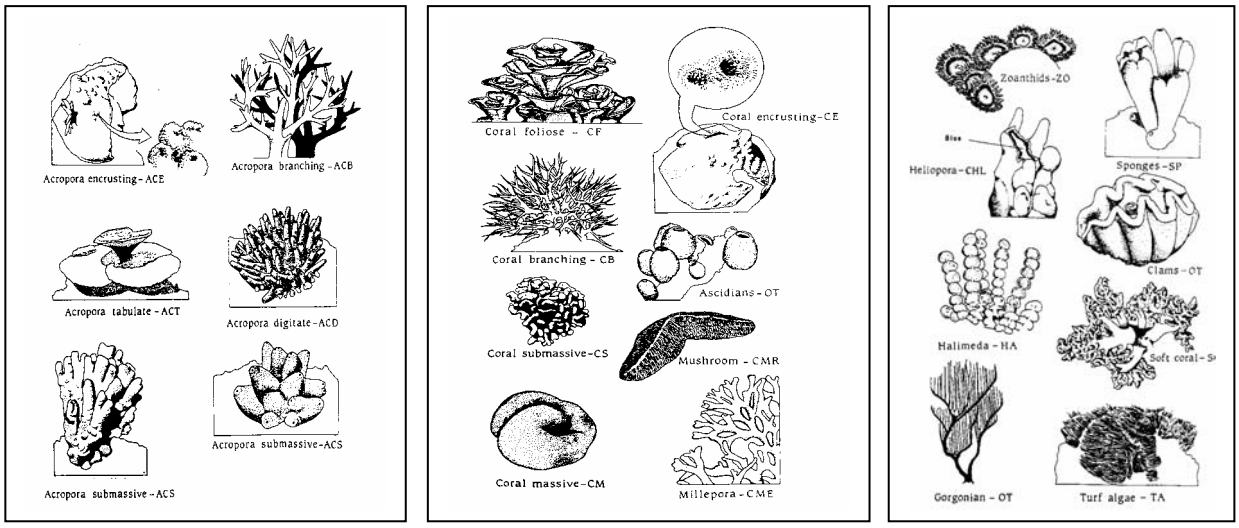


Figure 5 - GCRMN Biotic Lifeform Categories

Water Quality Data:

The data collected consisted of salinity measured by a refractometer, temperature taken with a thermometer, and vertical visibility measured with a secchi disc.

Pterapogon kauderni (BCF) Population Data:

Data was collected at a number of known fishing sites and at a "control" site, where fishing is not allowed - sited within a Pearl farm concession area which is strictly guarded. Data was collected using two methods: Transect, where the same transect was used as for LIT substrate data collection, and Swim Survey, where observers swam in a line to collect data, but without laying a line.

BCF lives in symbiotic relationship with diadema urchins, and/or to a lesser extent with branching corals and sea anemones. For both methods, the data collected covered both fish numbers and diadema urchin numbers. Fish were divided into juveniles and adults, using a SL (Standard Length - from nose tip to base of tail) of 3.5cm as the dividing point, as this is the lowest recorded length for sexual maturity (Kolm & Berglund 2003).

Data was analysed to show the ratio of juveniles to adult BCF, numbers of BCF per urchin, numbers of adult BCF per urchin, and ratio between these parameters at fished sites and the control site.

3.2. Selection of Survey Sites

Sites for the Sulawesi case study in the Banggai Archipelago were chosen based on secondary data (Lunn & Moreau 2001, Allen & McKenna 2001, Vagelli & Erdmann 2002) and confirmed on arrival based on information from local sources and on available transport, especially the loan of the speed boat from the Dinas Kelautan dan Perikanan (DKP), the Regency level Marine and Fisheries Department. Available secondary data related almost exclusively to the Banggai endemic ornamental species *Pterapogon kauderni*, more often known as the Banggai Cardinalfish or contracted to BCF. Figure 6 below, adapted from Lunn & Moreau 2001 with data from Allen and McKenna 2001 added in red, shows the active BCF trading villages in 2001 and known BCF sites from the Marine RAP expedition in 1998, sponsored by CI (Conservation International), the villages where data was collected for this study are highlighted by underlining.

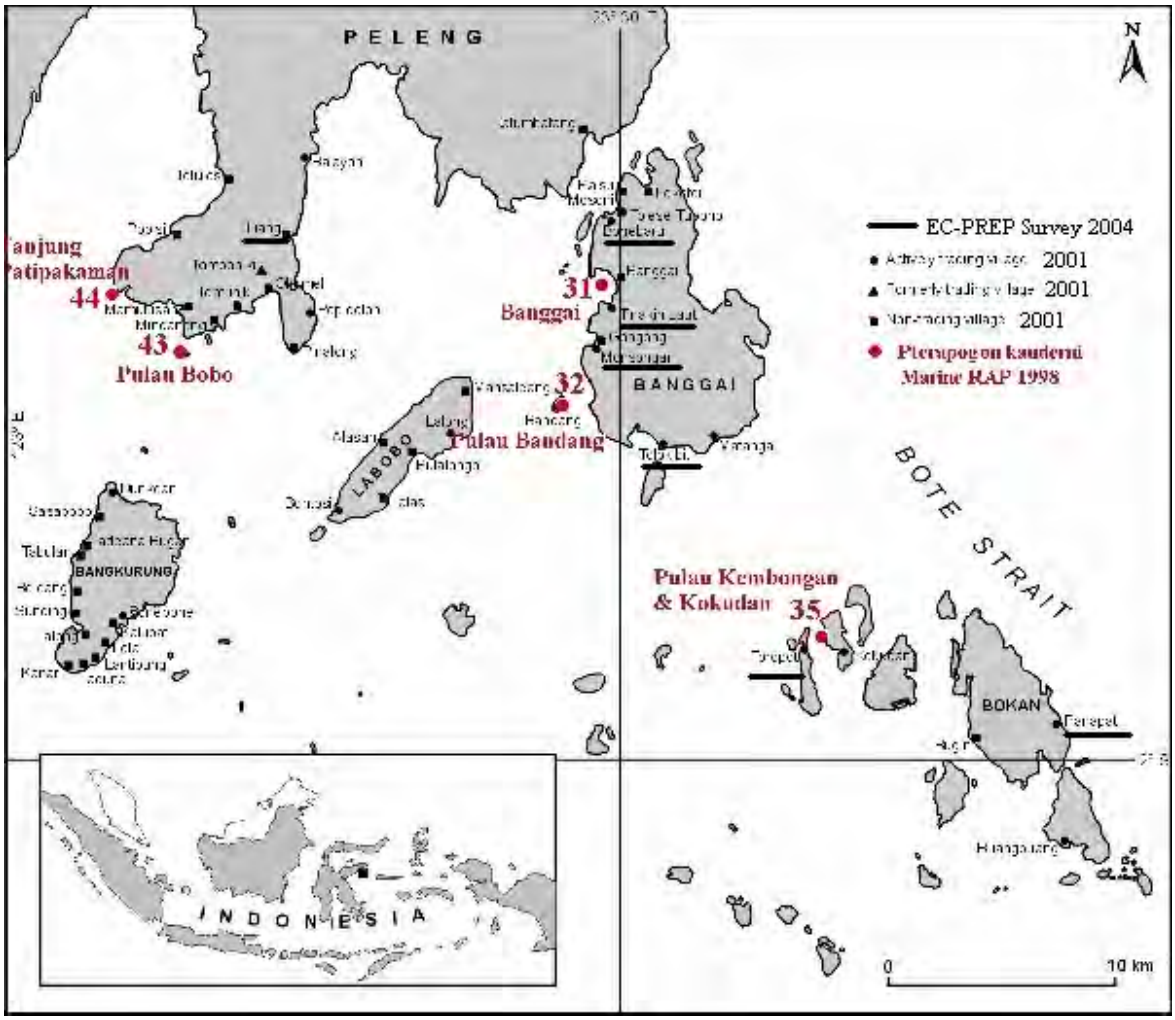


Figure 6 - Villages in EC-PREP Sulawesi Livelihood Survey 2004

The four villages in Banggai District (Bone Baru, Tinakin Laut, Monsongan and Tolokibit) and the two in Bokan Kepulauan District (Panapat and Toropot) are all known to have been significantly involved in ornamental fish trading in 2001, but to have had different trading patterns at that time. Liang was selected as the site of a reported local near-extinction of BCF and as the site of a recently established Marine Secondary High School. The selected "control site" was a Pearl farm within the territory of Monsongan village, in a bay where no local fishermen are allowed to enter and therefore no ornamental fishing occurs. The main livelihood survey was in Bone Baru, Monsongan and Panapat, with less detailed data collected from other villages.

3.3. Overview of the Sites for Sulawesi - Banggai Case Study

The sites have been grouped by geographical proximity and administrative area. However, some data and information is relevant for the whole area. Further maps covering administrative and resource aspects (based on anonymous 2003) are given in Appendix 4, and more detailed information relevant to each of the two Districts and some extra information per village is given in Appendix 5. This shows that overall Banggai District has better infrastructure and services than Bokan Kepulauan District, but both have very high levels of poverty. The information given is largely based on secondary data, though some field observations have been included.

It is worth noting that Banggai is the name of the town Banggai, which is the capital of the Banggai Kecamatan or District, which is largely composed of Banggai Island, only one of the islands in the Banggai Archipelago (Kepulauan Banggai). Banggai is now the (supposedly provisional) capital of Banggai Kepulauan Regency. The nearby mainland of Sulawesi is part of Luwuk-Banggai Regency, with Luwuk as its capital, also often referred to as Banggai. Therefore when using the word "Banggai" it is important to make sure it is clear whether the name refers to the Town, District, Island, Archipelago, or Regency - and if Regency, which one!

Banggai Kepulauan Kabupaten or Regency is often referred to as Bangkep and is the easternmost Kabupaten in Central Sulawesi, Indonesia, and is comprised of the Banggai Archipelago and it's surrounding waters to a distance of 4 nautical miles from shore. The Regency spans 1° 06' 30" S to 2° 20' 00" S and 122° 40' 00" E to 124° 13' 30" E. The Archipelago consists of around 120 Islands, with a total area of around 22,043 km² and a land area of around 3,215km². Initially there were 7 Districts or Kecamatan. This has since increased to nine, one of the new Districts being Bokan Kepulauan (Bokep), where part of the survey took place, formerly part of the Lo-Bangkurung District. This recent division means some statistical data is not available for the new Districts. An administrative map of Bangkep showing the various Districts (each in a different colour) is given in Figure 7 (adapted from Anonymous 2003). The main reference map used during the survey was the navigation map of the area, No 311 in the Indonesian Hydrographic Department series (Dinas Hidro-Oseanografi 1985).

Figure 7 - Banggai Kepulauan Regency Administrative Map

Climate:

The climate of the Banggai Archipelago is equatorial, as the entire area is within less than 5° of the equator, and is dominated by a monsoonal weather pattern, the effects of which are modified by the geophysical features of the Archipelago and surrounding areas. Daytime air temperatures range from 30° to 35°C, with an average in 2001 of 31.7°C, and night-time temperatures vary between 21° and 25°C, with an average in 2001 of 23°C. The average overall temperature in 2001 was 27.5°C, quite similar to average near-surface sea water temperatures recorded for the area in 2003 and 2004, which are from 26° to 29°C, but mostly either 27° or 28°C.

The weather type given in is Agroclimatic Zone E (Oldeman & Darmiyati 1977) with 3 to 4 consecutive "wet" months and two to six consecutive "dry" months, with a fairly high average annual rainfall of 2,000-3,000mm (Whitten et al 2002). The climate is relatively dry compared to much of the nearby mainland Sulawesi, according to local people, and villagers say that most years there can be no significant rain for several months. Generally the wet season is from November to February and the driest months are June to September. However conditions can vary greatly from year to year.

Winds can be strong but rarely reach gale force. However freak gusts can occur, as can tornadoes. The latter are much feared by sailors, who (as also in other areas of Indonesia) at once remove their clothes and face the tornado, praying for it to spare them[1]. The dominant wind directions (Whitten et al 1987) are: (i) NW winds starting in September and often quite strong form November to March, variously called North or West season (musim) depending on the area, and generally bringing the highest rainfall of the year; (ii) SE winds from around July to September, frequently called South or East season (musim), often bringing dry weather or even drought and (iii) SW or variable winds from April to June, sometimes humid and sometimes also called South season (musim). However based on the information given by OF collectors and other locals during the survey, the exact wind direction, timing and strength varies from place to place across the Archipelago, as can be seen later in the seasonal calendars drawn up in some villages.

Topography: There are 5 major Islands (Pulau), which are, in order of decreasing size: Peleng (around 2480km²); Banggai (294.39km²), Bangkulu and Labobo (together around 200km²) and Bokan also called Salue Besar. Bokan is surrounded by a number of islands, 6 of which are large enough to have substantial villages on them, and which together have an area of 229 km². Many of the smaller islands are also inhabited, though some are only visited seasonally or totally uninhabited. (The surrounding mainland to the North and North West is part of Luwuk-Banggai Regency, to the SouthWest is Morowali Regency, to the South lies South East Sulawesi (Sulawesi Tenggara), and to the East lies the Maluccan Archipelago (Ambon). The land area is mainly hilly, but only around 6% is mountainous (over 700m altitude) with 86% of the land area under 500m altitude.

Tectonic status: The Archipelago is situated on several fault lines (Appendix 4) and tectonic events are common. The most recent major earthquake was on 4th May 2000, with a epicentre at 26m depth under the sea just South of Peleng Island, with a magnitude of 7.6 on the Richter scale, and was followed by a Tsunami reaching 10-15m in height in some places. Some of the underlying plaque tilted, so that some areas have been raised and some lowered. In coastal areas this has resulted in some reefs and other shallow areas becoming permanently above the tide line, while some coastal land has been submerged. One small island reputedly disappeared. There was some loss of life as well as considerable damage to private and public infrastructure (homes, boats, roads, jetties, bridges, public buildings, electricity and water supplies, etc). Quite substantial aid was donated from National and International sources, though according to local

[1] The tradition has it that tornadoes are female and will run away from the sight of a naked male.

people not all found it's way to the intended beneficiaries, and many direct and indirect losses were not covered.

Geology: Much of the land is rocky, with extensive limestone formations (fossil reefs?), and relatively thin and/or poor topsoil. The underlying plate is mainly granitic, and originally part of the Australasian plaque. The main geological components are Metamorphic rocks, Upper Tertiary Marine Sediments and Tertiary Volcanic Rocks (Whitten et al). The Banggai Islands have relatively little of the friable composite layers common for example in the hilly and mountainous areas of Western Central Sulawesi, and landslides are not common, in spite of the frequent tectonic activity.

Mineral Resources: Oil reserves are reputed to lie beneath the sea bed, however as these resources are also accessible form the waters of nearby Luwuk-Banggai Regency where exploration has already begun, it is unlikely that the Regency will benefit very much, although maybe an agreement will be reached. Other mineral resources include gold and mica.

Fresh Water Resources: there are several permanent river systems, and many seasonal streams. Most rivers on Peleng and Banggai Islands run form East to West, and the two main rivers on Banggai Island (Puso and Lambuko) both discharge into Banggai Bay. Ground water (wells) is the main source of water for human use, though all available sources are used. In spite of an increase in water supply systems, many people still do not have easy access to reasonable quantities of potable fresh water. The land clearance threatens the future quantity, stability (throughout the year) and quality of fresh water resources available for domestic and agricultural purposes and for potential tourism and industrial usage.

Land Cover and Resources: The native land-cover is lowland forest (Whitten et al). Where this has been cleared the topsoil can easily erode and uncultivated areas tend to revert to poor scrub cover. A land-use map is given in Appendix 4. Topsoil varies between 10cm and 1.5m, though most topsoil in areas visited by the team was seen to be thin, and often stony. There is a wide variation in soil pH, from acidic (pH around 4) to Basic (pH around 7.8), and some areas have high sulphate or aluminium levels. Therefore in many places agriculture, though currently the main occupation of the majority of Bangkep residents, does not offer the potential for much future expansion. Indeed, marginal lands (excessively steep or thin/poor soil) are already being cleared (field observation) to cope with local demand, including from pressures due to population growth. Based on 2001 official statistics, around 45% of the land area was still covered by forest, including quite extensive protected forest areas. However based on observation, the actual forest cover is already substantially below these levels, and it is likely that the map is already significantly inaccurate.

Oceanography: The total sea area under Bangkep jurisdiction is around 18,828 km², well in excess of the land area, indeed the sea area comprises around 85% of the Regency. Most of this area consists of relatively shallow seas, with many coral reefs. However there are deeper areas around the edges of the Archipelago (Dinas Hidro-Oseanografi 1985). Water quality is generally high with low turbidity and normal salinity of 34-35 ppt. More detail is given in Appendix 8 and II. However the land use changes mentioned above could potentially have negative impacts on water quality in certain areas and seasons. Three major up-welling zones are reported (Anonymous 2003). Generally upwelling zones result in lower than average temperatures and high productivity (Barnes & Hughes 1988), and this would seem to be the case for the Banggai. Average recorded water temperatures (Anonymous 2003, Appendix 3) of 27°-28° are slightly lower than on the West Coast of Sulawesi or in Tomini Bay (team members data) at similar latitudes, where 29°C to 31°C are more common, and fisheries productivity in the waters of the Banggai Regency is high (Anonymous 2003).

Tides: The tidal amplitude is generally under 2m (Hydrographic Department 1997), with a basically diurnal pattern. However, the pattern of high and low tide varies considerably, with

some days having almost no tide either above or conversely below the mean tide level, or apparently having only one major tidal cycle, and a wide variation in tidal amplitude and characteristics over the moon cycle as well as between seasons. In some places at some times tidal amplitudes can reach 3m.

Waves and Currents: Due to the topography of the archipelago, currents through many of the straits can be strong, up to 10 knots and cause whirlpools which are a threat to even quite large vessels in certain wind and/or tide conditions (Engels pers.com., La Ana pers.com., field observation), which make due care and local knowledge of importance in all water-borne activities. Even outside of the straits, currents can be strong enough to affect activities and even pose a danger to seafarers. Waves can also be quite large and even small waves can cause a hazard because of wind against current, shallow grounds and other factors. Every year there are casualties from among the unwary or unlucky, as in most maritime communities.

Coastal Ecosystems: All known types of coral reef occur in the Banggai Archipelago, i.e. Fringing, Barrier, Patch and Atoll reefs (Appendix II). Coral biodiversity is high and many areas of coral in good condition can still be found (Allen & McKenna 2001, Anonymous 2003, observation). These have high fishery and tourism potential. Extensive seagrass beds (Appendix II) are important feeding and nursery grounds for dugong, marine turtles and many fish and invertebrate species. The extensive coral reefs and seagrass beds are complimented by mangrove stands which though generally not extensive, play an important ecological role as breeding, feeding and nursery grounds for a wide range of marine and terrestrial species including many species of economic value. Mangrove stands also provide many other products including wood for construction and cooking, roofing materials (nipa palm), mud crabs (*Scylla sp.)* and bivalve molluscs etc. Much of the coastline is fringed with white or golden sand beaches, ideal for small or medium scale nature-based tourism, though generally not of a size of type suitable to accommodate mass tourism.

Conservation Value: The Banggai Archipelago is within the Wallacea region of maximum marine Biodiversity (Allen & McKenna 2001), and is home to a number of rare, endemic and/or endangered marine species. These include the endemic Banggai Cardinal Fish (*Pterapogon kauderni*), and protected species such as the coconut crab (*Birgus latro*), several species of sea turtle (*Chelonia mydas, Eretmochelys imbricata, Dermochelys coriacea, Caretta caretta*), Dugong (*Dugong dugon*), Napoleon Wrasse (*Cheilinus undulatus*) and others. One island (Pulau Burung or Lokoi) is entirely covered in Mangrove stands, and is the nesting ground for an endangered bird species, the Nicobar Pigeon (*Caloenas nicobarica*), locally called Burung Nduluna or Burung Emas (Anonymous 2003). All mangrove forests enjoy statutory protection, but in spite of expressed concern and a number of proposals, no conservation action has as yet been taken in respect of this important conservation asset with tourism potential.

Population: Official population Data from 2001 is given in Appendix 4 on the Administrative Areas Map. The population density has increased greatly in the last 20 or so years, as in 1981 it was only 30 inhabitants per km² (Whitten et al 1987), in 2001 it was 45 (Anonymous 2003). For the two survey Districts, density has continued to increase. In 2001, over 50% of the population was officially below the poverty line (pra-sejahtera). Around 55% of fishers were based in Lo-Bangkurung (now split into Lo-Bangkurung and Bokan Kepulauan) or Banggai Districts, with 45% split between the remaining 5 Districts (now 6). Although many ethnic groups are represented, the two main groups are the indigenous Banggai ethnic and the Bajo or Sea Gypsy ethnic. The Bajo are part of one people spread over much of South-East Asia, are traditionally totally dependent on marine resources, and often have strong family ties to other parts of Sulawesi, Indonesia or even other countries (e.g. Philippines). Other significant ethnic groups in terms of numbers include Buton people from South east Sulawesi, Minahasa and Sanghir people from North Sulawesi, Gorontalo ethnic, Bugis and Makassar ethnic groups from South Sulawesi, Javanese, Balinese, people from nearby Maluku and Ambon and other Central Sulawesi ethnic

groups such as Kaili, Moro, Taa etc. Chinese ethnic people are few but hold some important economic positions, such as the family owning the Pearl Farm. The main religions are Islam, followed by both Protestant and Catholic Christians. There has never been any ethnic or religious-based strife in Bangkep to date, and people clearly want to keep it that way.

Infrastructure: A map with major infrastructure components is given in Appendix 4. It is clear from these data and from observations that the general infrastructure in Bangkep is still relatively undeveloped, especially on the smaller islands. The major earthquake which occurred in the first year of the Regency's independence destroyed much previous infrastructure, much of which was already in need of repair. Rebuilding has been the major focus, and is now generally complete to pre-2000 standards or better. Now the regency is looking to improve infrastructure whenever resources are available. Fuel is a particular problem, with only one fuel service station on Banggai Island, in Banggai, and none on the outer islands. The supplies are from Manado and both the quantity delivered and the physical delivery capacity of the one operational pump are incapable of fully meeting current demand, let alone supporting growth.

Bangkep can only be reached by sea (see Appendix 2, A2.5), by nightly wooden ferry from the nearby port of Luwuk or by PELNI liner (KM Sinabung) from Manado to the North, Bau-Bau, Makassar and Jakarta to the South, with calls at several other ports across Indonesia. Peleng (the largest island) and Banggai Islands have relatively developed road networks, though still in need of improvement in quality and extent. Public transport between islands is by local ferries, some wooden vessels, others large fibreglass speedboats, which run on a daily basis to many villages and cost from around IDR 8,000 to IDR 20,000 depending on route and type of vessel.

Health: Health care is an area which was particularly poorly served, with no proper hospital and very few fully trained medical staff. In 2001 there were only 7 General practitioners (no specialist doctors), one dentist, and two assistant pharmacists (no fully qualified pharmacist) and only one in-patient clinic. Around 80% of the health buildings infrastructure and almost all equipment and supplies were destroyed by the earthquake in 2000, a few months after the Regency became independent. Since then there have been major advances, in both infrastructure and trained manpower. All facilities (buildings) were rebuilt by 2003, and since then there has been a step by step capacity building programme, mainly investing in human resources. There are now several in-patient clinics across the archipelago (5 and more planned), at least 1 doctor in all Districts, 72 new paramedics have been recruited and an agreement has been made with Sam Ratulangi University (UNSRAT) in Manado for short-term specialist medical staff (on a rotation basis for work-experience) and further training. The Health service aims to have a Bidan Desa (village nurse/midwife) and sub-clinic (Posyandu) in each village and has nearly achieved this target. The new hospital currently being built at Adean, about 6km south of Banggai Town, will be the largest outside Palu in Central Sulawesi, and serve part of Maluku area as well as Bangkep Regency. Plans are also underway to make health care more accessible to the poor, under an upgrading of the national scheme for free health care to the poor, though there are fears that the criteria set (nationally) may leave many needy people in this area still unable to afford health care.

Health care aspects related to the ornamental fish trade and indeed to the fishing community generally were similar for all villages visited and according to the Health department apply across the Regency, therefore are given here. The major life-threatening health problems are still Malaria and Sickness and Diarrhoea, in spite of long-running campaigns to mitigate both. Other frequent problems are skin diseases (visible in all survey villages) and less frequent but severe, diving-related problems. The latter are manly related to the effects of pressure at depth and on return to the surface, and range from ear damage to joint pains (mild cases of "the bends") to death from severe decompression sickness. Partial paralysis is not uncommon, and sometimes partial or almost full use of affected body parts is regained in time, but many never recover, and become a heavy burden on their families until they die. The Health department has already had

staff trained in pressure chamber use and maintenance, but as yet has no funds to obtain an chamber. There is no existing chamber accessible within a reasonable time frame without travel by air and/or over mountains, both strictly forbidden for decompression sickness cases. The main (overt) reason for wanting a chamber is to develop Dive tourism, for which the area is eminently suitable, but of course as the Department head said, it would also be there for treating local fishers. In addition to ornamental fishing, compressors are used extensively in sea cucumber, lobster, and other invertebrate fisheries and in some live reef food fish fisheries. Note that compressors are not used in the BCF fishery, as this species is found in shallow waters where such equipment is not necessary.

Economic Base[2]: The economy is based on agriculture and to a lesser extent fisheries. In 2001, fisheries represented around 6% of total Gross Product, but over the period 1997 to 2001 was the fastest growing sector, with a real value increase of over 7%. These figures are based on highly unreliable data. However several important point regarding the economy can be stated with confidence. Firstly, the economy is almost 100% based on extractive activities (fishery and forestry) and primary production (agriculture, aquaculture) with very little in the way of transformation industry, either "cottage " industry or larger scale, and services, either aimed at local people or for (the very few) visitors. Although no figures are available, one of the biggest local income earners in terms of Government revenue is the pearl farming industry.

Effects of Regional Autonomy: In terms of PAD (Pendapatan Asli Daerah - Government income derived locally) the Regency is one of the poorest in Central Sulawesi, itself among the four poorest in Indonesia according to an NRM (USAID) report. This means that under the previous system where all regions sent income to Jakarta for redistribution, Bangkep should have been a net gainer - but being part of a larger area which did not devote many resources to the archipelago, this did not happen. Under Regional Autonomy, the subsidies from the centre to poorer regions are being gradually reduced. This means that Bangkep is likely to become ever poorer and have great difficulty in providing basic services (such as health and education) in the future unless it can build an economic base which can provide sustainable sources of income while the Central Government subsidies are still available, even if already reduced. Under this scenario, the potentially lucrative ornamental fish trade which up to now has made little or no contribution to Regency revenue (PAD) is or at least should be of great interest to policy makers.

Fisheries Resources: There was a substantial increase in registered fisheries vessels (over 100%) and equipment over the period 2000 to 2002 (see Appendix 4), and the latest available data by District is given in Appendix 5. During the same period the number of fishers increased by over 50%.The Regency Government is (and has been since the Regency became independent) committed to growth in the Marine and Fisheries sector, and more recent data, if it were available, would no doubt reflect this.

From figures quoted in Anonymous 2003, in 2001 ornamental fish was a valuable commodity, with an overall value around 75% of the live grouper trade, and representing around 8% of marine/fisheries produce, including seaweed and invertebrates as well as fin-fish, but excluding processed products such as salt dried fish or smoked fish. However the Fisheries Department and the Trade and Industry Department say there are no real data on the ornamental fishery, as there has never been any system for collecting this information, and therefore any "data" entered will be someone's best "guestimate". Both say that there has never been any official Government revenue from this trade. This lack of data is not limited to ornamental fish. Data on fisheries potential which is widely published (e.g. in Anonymous 2003) is, according to the Fisheries Department Data Officer, based on no real data or information, because there is none. The truth is that everyone knows the fishery resources are quite high, but no-one has any idea of their true level. In addition, available capture data bears no relevance to the estimation of real resource

[2] Based on Anonymous 2003a&b

values because only an unknown fraction of fish and other marine resources caught are ever reported. Far more fish are caught by vessels from outside the area, many of which are foreign flag or foreign owned, than by local fishermen, possibly by several orders of magnitude. Some of these vessels have licences to fish, some do not. Those which do have licences also (almost?) all operate to some extent illegally, for example in failing to report to local authorities or in false reporting of the quantity or species they catch. Very few make any contribution to the Regency or Province whose resources they take. A significant number use themselves or encourage the local fishers to use destructive fishing techniques, especially trawling and cyanide fishing. Bomb fishing is more often for in-country dried fish or fresh fish production, and there is significant smuggling of the "fertiliser" brands used, such as "Mata Hari", which are not suitable for agriculture. Local production is also poorly documented as most comes ashore in small quantities in villages, where to date there is no proper data collection system. Better data is available for locally dried or frozen produce leaving the area (usually for other in-country destinations), as this often does go through at least some of the "correct" procedures, including reporting and paying of dues to the Trade and Industry Department. The data collection system and regulations are discussed further in the "Stakeholders" section, Chapter 4.

Tourism: The Tourism Sector, and especially Accommodation, is very poorly developed. In 2001 there were only 2 hotels, both in Banggai, with only 15 rooms and 29 beds between them (Anonymous 2003a). According to 2002 statistics there were 3 Hotels, with 23 rooms and 43 beds, all in Banggai Town (BPS 2003a). From observation on the field visit this has not changed significantly. The only known tourism operator is a Dive tourism company based in Luwuk and runs live-aboards which apparently makes little contribution to local economy.

Regency Policy: In view of the marine-weighted available resource base, the Bangkep Regency administration in it's official Vision, Mission and Strategy statement has declared it's intention of building the future of the Archipelago largely on the (sustainable) exploitation of Marine and Coastal Resources, one of which is ornamental fish. Improving the livelihoods of Regency residents is also part of the Mission statement.

Security and law-enforcement: Although Banggai has not experienced any civil unrest as in the neighbouring Maluku Islands, or in Poso on the Mainland, there are several important issues related to security and law-enforcement which so far the authorities have not been able to address (Anonymous 2003, confirmed by field data). In particular:

- Many illegal and destructive practices are practised by local fishers.
- Coral Mining is rife, including use in official Government projects, despite a national law forbidding this practice.
- Piracy is a serious issue, and while not particularly frequent, in addition to the immediate effects on the victims, the knowledge of these events does instil unease and effectively reduces the freedom of movement on the seas for some islanders, and is a consideration for potential investors.
- Incursions by foreign vessels often occur. These vessels are often much better equipped and larger than local craft, using advanced gear to "steal" substantial quantities of fish, including illegal trawling gear. These illegal competitors reduce present and future resources available to Banggai fishers through stock reduction and environmental destruction. By using intimidation direct access to resources is also sometimes reduced. An additional loss to the country occurs when these illegal operators obtain subsidised fuel from Indonesian suppliers, thereby benefiting from international loan funds which are meant to assist the local poor.
- The capacity of the enforcement agencies is extremely limited and there is little synergy or co-operation between local people and law enforcement agencies. The Fisheries department has only one Surveillance Officer, one Speed Boat, often used for other purposes, and no communications equipment (e.g. 2-way radio such as VHF). There is no Naval Base or Navy Vessel operating in the area. For more detailed information see Stakeholders, Chapter 4.

3.3.1 Banggai District (Bone Baru, Monsongan, Tinakin Laut, Tolokibit)

In 2001, five villages were actively collecting and trading in BCF, and there was a local buyer in Banggai Town. Two villages, Bone Baru and Monsongan were chosen as main survey sites, and additional data was collected at Tinakin Laut and Tolokibit. A map showing the survey villages and biophysical survey sites is shown in Figure 8 opposite.

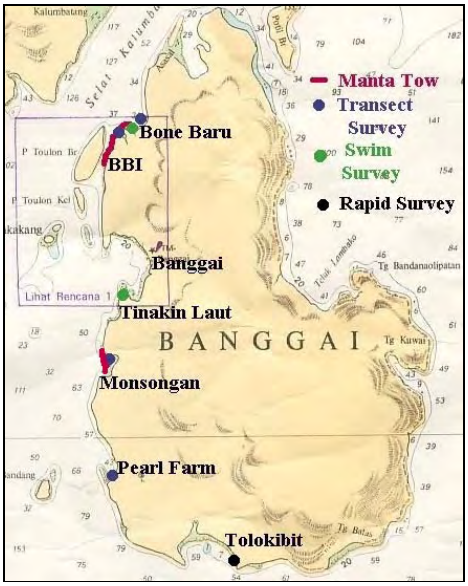


Figure 8: Survey Sites in Banggai District

Although more detailed welfare data is given in the village profiles and later in Chapter 6, Livelihoods analysis, the relative status of the four villages in terms of official population welfare levels compared to the status for the Banggai District as a whole (in red) is shown in Figure 9 below.

The official wealth/welfare categories used are defined fully in Appendix 6, but a brief explanation of the terms used is given in Table 2 below.

Table 2 - Official Wealth/Welfare Categories

Term	Pra-Sejahtera	Sejahtera I	Sejahtera II	Sejahtera III	Sejahtera III+
Meaning	Below the Poverty Line	Borderline Poor	Reasonably Well Off/ Average	Well Off	Well of + Philanthropic

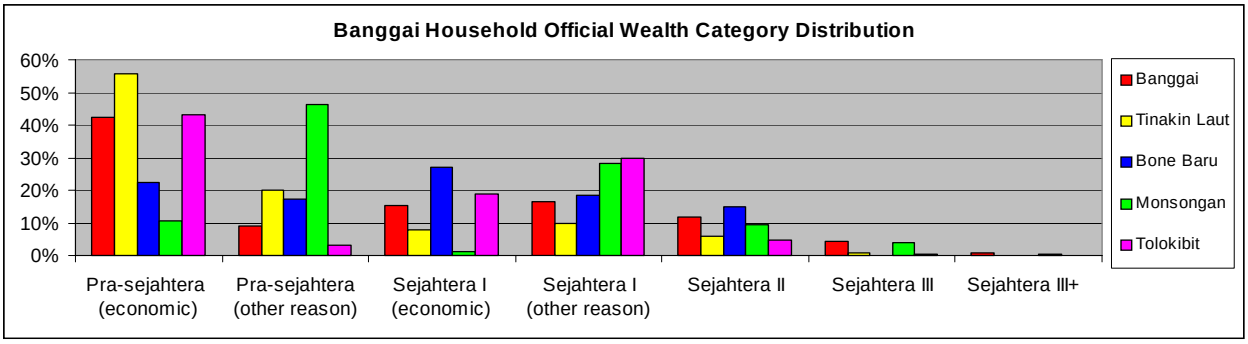


Figure 9 - Wealth Category Distribution in 2003 (from BKKBN[3] Data)

The official wealth category distribution shows nearly half of the population is below the poverty line (49%) and most of the remainder (32%) is only just above it. The figure of 17% in the higher welfare classes is even lower than for Bokan Kepulauan, generally considered a poorer area. Tinakin Laut, just across the Bay from the Regency offices has the highest poverty level, despite having good access to Banggai and an active port, and is rivalled by Tolokibit, with much poorer access to many facilities. Monsongan has a most unusual welfare/wealth profile, with "other" (non-economic) reasons for "pra-sejahtera" dominating, while Bone Baru has the lowest but still significant poverty levels.

A profile of each of these villages, including general population data, resources and infrastructure, is given below. Representative photographs of each village are given in Figure 10, after the statistical data, and video clips of all except Tolokibit can be seen in Appendix 7.

[3] See Stakeholders Chapter 4 for details of BKKBN

3.3.1.1 Bone Baru:

Bone Baru was reported as one of the main BCF fishing villages in 2001 (Lunn & Moreau 2001), though less so then than Tinakin Laut or Monsongan, and the DKP staff said that as far as they knew it was now the most active ornamental fish trading village in Banggai District and one of the most active in Bangkep.

Bone Baru Desa, with a land area of 842 hectares, is situated 9 km to the North of Banggai, the temporary capital of the Bangkep Regency, on Banggai Island, in Banggai Kecamatan (District), which has 20 villages. There are 5 islands named in the official statistics (BPS 2004a) of which the largest are Toulan (82 hectares) and Toulan Kecil (4 hectares), the other 3 islands all being under 1 hectare in area. Most of the land area is hilly (84%), with all of the land below 500m altitude and 16% coastal plain. Agriculture is a major economic activity even though the Village only covers under 3% of the District area, and Bone Baru is not sufficient in basic agricultural foods (rice). Approximate co-ordinates are : 1° 31" 50' S and 123° 29" '45' E[4]. Bone Baru is 9km as the crow flies (and not much further by road or by sea) from Banggai, the Regency and District capital. There are no rivers listed in Bone Baru village in official statistics, however there is a stream discharging into the bay near the village.

Land use is given in Table 3a below, and shows that most available land is already being cultivated or used in some other way.

Table 3a - Land Use in Bone Baru (in Hectares)

Arable	Plantation	Urban	Unused	Other	Total	% Unused
75	727	8	18	14	842	2%

The main seasonal products are the endemic Banggai root vegetable "ubi banggai" other staple (starchy)foods, peanuts, and a few assorted vegetables while the main plantation (cash) crops are (in order of number of trees) coconut, clove, cocoa, cashew nut, sago and coffee.

The cultivated area per household is 4.5 hectares. In most areas 2 hectares is considered sufficient for the needs of one household, and is the area generally distributed under Government schemes. If this land was shared relatively equally it should be able to provide a reasonable livelihood for all inhabitants. However it seems that much is part of large plantations owned by a few people, and most own less then 2 hectares. As the soil is relatively poor, 2 hectares is not really enough to provide for most households needs in this area. The FGD revealed that a few villagers farm lands in other nearby villages, up to 2-3km away from Bone Baru, and that much firewood is gathered from these areas as well as from any available local sources.

Population Data

The village profile (Monografi Desa) which should be maintained by every village head as a statutory duty was not complete, as for most villages the team members have visited during this project and on other projects throughout Central Sulawesi, as the previous Village Head did not take this duty seriously. However the current village head is attempting to rectify this since taking office in 2003, and some information was available for 2003, however 2004 figures were not available. This is shown, together with the official statistics, in the following tables.

According to the Monografi Desa (MD), the 2003 population was 726 with 176 households. The village has only 2 sub-villages or Dusun. The main ethnic groups are Banggai, Bugis and Bajo. Average household size was therefore just over 4, with a high proportion with declared occupations (52 %), and therefore presumably of working age. Of these 176 households, 165 (94%) were considered “pra-sejahtera”, or below the official Government poverty line, by the

[4] GPS Field Data

Village head in the MD, and 9 (5%) were “miskin”, below the lowest category, or the “poorest of the poor“. Population data are shown in Tables 3b to 3g below.

Table 3b - Population density and Growth Bone Baru

Source	Total Population	Population density/km²	Population Growth Rate[5]	Households	Average Household Size
MD	726	86	No data	176	4.1
BKKBN 2003	674		No Data	169	4
BPS 2004a	710	84	2.07	176	4

The population growth is partly due excess of inmigration over emigration, partly to excess of births over deaths. Household size is not a good indicator of numbers of people per house. In almost all fishing families in particular several households live in each house. Many people who in reality are "dependants" are considered as separate family heads/households by official rules. This is especially true for the poorer families.

Table 3c - Main Occupations Bone Baru

MD	**Farming**	**Fishing**	**Civil Servant (PNS)**		**Other**
	350	25	3		0
BPS 2003a	**Farming/Fishing**	**Industry**	**Commerce**	**PNS**	**Other**
	276	14	9	4	18

Note that the lack of any small business sector according to the MD does not tally with the observed occupations which include the sale (wholesale) of dried fish and the running or small stalls or “kios”. The statistics (BPS 2003a) do not split fishing and farming. More information on local businesses is given in the Services and Infrastructure section below.

Table 3d - Population by Sex and Religion Bone Baru

Male	Female	Sex Ratio F/M	Islam	Christian
350	360	1.03	522 - 74%	188 - 26%
Male	**Female**	**Sex Ratio F/M**	**Data from BKKBN**	
340	334	0.98	N/A	N/A

The sex ratio is close to 1, whichever set of figures are correct. The majority of the population is Muslim, and live in the Dusun (sub-village) the team visited, which is the largest Dusun and is also where the KD lives. The majority of Christian inhabitants live in the smaller Dusun situated next to the BBI or Hatchery which is being built by the Marine & Fisheries Department (DKP), and do not take part in ornamental fish collection.

Table 3e - Age Distribution and Employment Bone Baru

BPS 2002a	**Working Age 15 - 55**	**Employed or Working**	**Primary/Middle School Age 7-15**	**Pre-school and Old People**	**Married People**
	337 - 47%	360 - 51%	153 - 22%	220 - 31%	281 - 40%
BKKBN	**16 - 59**	**Pre-school 0-6**	**7-15**	**60 and Over**	**Married Household Heads**
	343 - 51%	97 -15%	193 - 29%	39 - 6%	145 - 86%

The number of people officially engaged in some gainful occupation exceeds the number of people of "working" age, indicating that every adult (of both sexes) has some form of occupation

[5] Average yearly growth over the period 1997 to 2003

and that some people work beyond expected "retirement" age or that child labour is common. This BPS data conflicts with the FGD and KI data which says that most women do not work outside the home, and the BKKBN data which shows 96% of women who are either household heads or wives do not work (do not have a regular gainful activity). This discrepancy could be due to the fact that most women do take some part at least in farming activities, although they themselves do not perceive this as outside work. Conversations held during the survey also revealed that very few households have only one source of income/livelihood. This is reflected in the seasonal calendar.

Table 3f - Educational Attainment Bone Baru

	Primary School	**Middle School**	**High School**	**University/ Other Higher**	**Unknown/ Small Children**
Age-group	115	38	25	No Data	N/A
Attending school	110 - 96%	20 - 53%	7 - 28%	No Data	N/A
Graduated	315	34	17	2	342
% population	44%	5%	2%	<1%	48%
BKKBN Data Educational attainment of household heads & School Attendance	**Didn't complete Primary School**	**Completed Primary or Middle School**	**Completed High School or above**	**Children 7-15 in school**	**Children 7- 15 not in School**
	20 - 12%	117- 69%	32 - 19%	170 - 88%	10% of Boys 14% of Girls

No data on education was available from the Monografi Desa. Based on BPS statistics, there is a substantial "data gap" - with the "unknown" category exceeding the likely number of pre-school and school age children in school, whose final attainment is of course still unknown. The BKKBN data only covers household heads, so the educational attainment of spouses is not available. From the BKKBN data, Bone Baru has the highest education attainment level of any of the survey villages, with nearly $1/5^{th}$ of household heads having completed high school or above and only 12% not having completed Primary education, a better level than the District average (Appendix 5).

Wealth/welfare status from a variety of sources is shown in Table 3g below.

Table 3g - Socio-economic Level of Bone Baru Households

MD	**Very Poor/Miskin**	**Poor/Pra-sejahtera**		**Not Poor**
	9 - 5%	165 - 94%		2 - 1% (by inference)
BPS 2003a	**Poor Pra-Sejahtera**	**Borderline Sejahtera I**	**Average Sejahtera II**	**Well Off Sejahtera III & IV**
	67 - 38%	88 - 55%	21 - 12%	0 - 0%
BKKBN	**Poor Pra-Sejahtera Economic Reasons**	**Borderline Sejahtera I Economic Reasons**	**Average Sejahtera II**	**Well Off Sejahtera III**
	38 - 22%	46 - 27%	25-15%	0
	Poor Pra-Sejahtera Other Reasons	**Borderline Sejahtera I Other Reasons**		**Well Off & Philanthropic Sejahtera III +**
	29 - 17%	31 - 18%		0

According to the village records (MD) there are 9 households in dire poverty and the vast majority are listed as below the official poverty line. This data conflicts with the BPS statistics data, showing the majority as being just above the poverty line. The BKKBN data is different from both. It is worth noting that payment of taxes (especially on property) is very low, with only 49% of taxes due actually collected. Whichever data is more accurate, poverty levels are significant.

Services and Infrastructure

Access to the village is by road or by sea. Public transport consists of minibuses which at the time of the main survey ran several times a day on an irregular but fairly frequent schedule, and could also be hired, and of "ojek" or motorbikes which take passengers for a set fee. The current cost of minibus travel to Banggai is 4,000Rp per person each way, and the journey takes about 30-40 minutes. At the time of the second visit, the minibuses had ceased regular operations, and would only run occasionally. An ojek is usually a bit faster and costs 5,000Rp each way, though regular users may only pay 4,000Rp.

There are 5 motorbikes in the village according to the village nurse and her husband, who works at the Department of trade and Industry, but no Bone Baru residents own four wheeled vehicles, although there is no official data on motorbike or other vehicle ownership for Bone Baru.

There is no public boat service, so access by sea is only possible with private vessels. However, this is the most usual means for villagers going to Banggai, especially if they are taking or bringing back quite large quantities of goods. Other services and infrastructure are shown in Table 3h below.

Table 3h - Services and Infrastructure in Bone Baru

Item	BPS	KI/FGD	Observation
Formal Education	Primary School (4 teachers, 94 pupils)	Primary School	
Additional Education Facilities		"Pendidikan luar Sekolah" for poor children[6]	
Basic Commodities	No Market 6 Kios	Most basics purchased from Kios	Several Kios operational
Fresh water Supply	No mains supply (PAM or PDAM)	There is a reservoir or holding tank, which feeds a number of large communal tanks (Figure B10). Water comes from the hills some kilometres away. Water runs out in the dry season, then wells are used which also run dry by evening but have water again in the morning.	
Sanitation	15 WC	Minimal, communal WC built by government project has no water supply and is becoming derelict.	
Health Care	Puskesmas Pembantu (Sub-Clinic) 1 Nurse/midwife 3 Traditional Healers Family Planning[7]	People use the Village Nurse/Midwife's services for a wide variety of medical and social needs Medicines are usually bought from the Kios and traditional healers The nearest Doctor is in Banggai	

[6] One teacher for 3 classes which run one after the other. The programme aims for basic literacy/ numeracy for all, and can continue up to STLP (Middle School) Certificate. Attendance is free, there is no uniform.

[7] According to BPS, 89 women use the Family Planning, or 73% of married women of reproductive age. Of these, 69 use the Pill and 20 use the injection method.

Table 3h - Services and Infrastructure in Bone Baru (continued)

Item	BPS	KI/FGD	Observation
Places of Worship	1 Mosque 1 Church	Religion is an important part of life, and religious festivals are community events	
Local Businesses	10 Carpenters 2 Tailors/Seamstresses 1 Goldsmith 3 Weavers[8]	Dried fish wholesalers (buying from throughout the archipelago) Most services required are available in Banggai (e.g. spares, repairs etc), many villagers have ancillary skills, and can do own repairs etc	
Road Access		Tarmac road to the village boundary (almost to the BBI), then dirt road for about 2km	
Access by Sea	No public service	Use own boats	No harbour facilities
Fisheries Infrastructure		BBI (Hatchery) under construction	
Communications	No telephone service	Information received through Radio (most own one) and TV (often in other people's houses)	
Electricity	Electricity is supplied by PLN	Many people have electricity, which is felt to be cheap (cheaper than kerosene), once installed.	

The fishing fleet is dominated by small dug-out canoes called "sampan", often motorised with long-shaft outboards called "ketintin". Most are around 5-6m long and between 45cm and 90cm wide, and most have outriggers (bamboo or occasionally wooden poles) on one or both sides for stability. Larger inboard vessels, usually built as a frame onto which planks are fitted, called "bodi". The smaller "bodi" are often built up from a dugout foundation. Typical boats are shown in Appendix 2 (A2.5).

Many small boats (sampan) are used as much or more for travel to/from "kebun", meaning farms or plantations (generally under 2 hectares) as for fishing, whereas larger vessels (bodi) tend to carry people and goods around the archipelago rather than be used for fishing.

Number and types of housing and household facilities based on official statistics (BPS 2003a) are shown in table 3i and 3j. Note that Permanent means of brick or cement construction with metal, tile, asbestos or other man-made roofing; Semi-permanent means with cement floor and at least partial brick/cement walls, with either man-made or other roofing; while Darurat means of wooden, bamboo, nipa palm or other (usually local natural resources) construction, roofing usually of nipa or other palm leaves.

Table 3i - Housing in Bone Baru (BPS 2003a)

Permanent	Semi-Permanent	Makeshift (Darurat)	Total	Liveable (Layak)	Households/ House (Avge)	Population/ House (Avge)
11 - 8%	23 - 16%	111 - 77%	145	91 - 63%	1.2	4.9

Although of non-permanent construction, many "Darurat" homes are considered fit to live in, but out of the total housing stock of 145, some 54, or 37% are considered unfit for human habitation by official standards. These would mainly be fisherman's houses, such as the "poor" dwellings shown in Figure 10, and include the homes of a number of ornamental fish collectors. Additional photographs of living conditions are given in Appendix 2 and Appendix 7.

The number of permanent or semi-permanent dwellings seen was considerable, by Indonesian, or at least Central Sulawesi standards. Normally this would indicate that many of the families are relatively well-off, and could be related to the discrepancies in wealth categories as one criteria

[8] Making tikar - a plaited carpet, or producing roofing materials from palm and other leaves

is the type of dwelling. Because of the earthquake (see historical events section below) many houses have been rebuilt to standards above that which might be normal for the level of average household income, in particular with cement or reasonable planked floors, as these materials were distributed as part of the aid after the earthquake. No cash was distributed, all aid was in the form of food and other basic consumables (such as soap) and building materials.

This overall better than average housing quality compared to other villages was reflected in the definitions of poor, average and well-off/rich given in the FGD, where the criteria are different from, say, Monsongan, also on Banggai Island and a similar distance from the capital and with better road/public transport access.

Table 3j - Household Facilities in Bone Baru (BPS 2003a)

Electric Lighting	Kerosene Lighting	Television/ Radio	% Houses with Electricity	% Houses with WC	Wood for Cooking	Unknown Cooking Fuel
63 Houses	74% - 131 Households	16 TV 9 Radio	45%	10%	158 households 90%	18 households 10%

Note the discrepancy between number of houses without electricity (55%) and households without electric lighting (74%), which is due to more than one poorer households living in some houses, as some data is given per house and some per household. However, the number of households with electricity has quite obviously increased since the data above (2002) even though figures are not available. Everyone would like to have electric lighting at least, as kerosene is dirty, smelly, increasingly expensive and, like all petroleum products in Bangkep, often in short supply. Note that since 2000 the number of televisions and radios has increased, though there are no 2004 figures. Radios are often battery operated so not dependent on an electricity supply, and are not infrequently taken to sea - an extra "living expense" (like cigarettes) not usually considered by either official figures or the fishermen themselves.

3.3.1.2. Monsongan

Based on Lunn & Moreau 2001, Monsongan was a major BCF fishing village in 2001, but according to the Fisheries Department was now less active than Bone Baru, a statement which was confirmed by our study. The reasons for this are not entirely clear, but available data and information are given and discussed in Chapters 5 and 6.

Monsongan Desa is situated 7 km to the South of Banggai, the temporary capital of the Bangkep Regency and the District capital, on Banggai Island, in Banggai Kecamatan (District), which has 20 villages (Anonymous 2004a), of which 16 are coastal villages. The total land area is 27.62 km², which is just over 9% of the District, making Monsongan one of the most extensive villages, and not surprisingly therefore the main source of income is from agriculture, however like almost all Bangkep villages, Monsongan village is not self-sufficient in the production of basic food staples.

Approximate co-ordinates are: 1° 38' 17" S and 123° 28' 59" E[9]. Most of the land area (87%) is hilly, with only 13% coastal plain, but is all below 500m. There is one river in the village territory, Sunggai Kokudang, and six small islands are listed (with names and land area), with a total land area of approximately 31 hectares, though the largest, Pulau Bandang, is inhabited, by one family.

Land use for Monsongan is shown below in Table 4a. It is clear that most available land has already been converted for agriculture. The main seasonal products are the endemic Banggai root vegetable "ubi banggai", other staple (starchy) foods, peanuts, and assorted vegetables while the

[9] GPS field data

main plantation (cash) crops are (in order of number of trees) coconut, clove, cocoa, cashew nut, coffee, sago and nutmeg.

Table 4a - Land Use in Monsongan (BPS 2003a)

Arable	Plantation	Urban	Unused	Other	Total	% Unused
443	2067	25	164	63	2762	< 6%

The land area under cultivation is high, such that if divided equally, the cultivated land would yield over 6 hectares per household, more than enough to provide for an acceptable livelihood. However, much of the land belongs to a few people, and most villagers have quite small holdings, often around or below 2 hectares, the generally accepted minimum land requirement to provide for a household. Few Bajo fisher families own land.

Population Data

The village profile (Monografi Desa) which should be maintained by every village head as a statutory duty was not complete, as for most villages the team members have visited during this project and on other projects throughout Central Sulawesi, however the Village Head does try to maintain a record, and this was made available to the team. Data from the Monografi Desa (MD) is shown, together with the most recent official statistics from 2003 (Anonymous 2004a), in the following tables. The village consists of 4 Dusun or sub-villages. The main ethnic groups are Banggai and Bajo, and most live on the coastal fringe, even those who farm the hilly hinterlands. The average household size is just over 4, and the number of major occupations exceeds that of households (by 20), inferring that some households have more than one major occupation. However, most Bajo families are fishers, and the although they may take part in various types of fishing, still generally earn their livelihoods at sea, with few owning land.

Of the 406 households, according to the official statistics (BPS 2003a) 60% are "pra-sejahtera", or below the official Government poverty line. Conversations held during the survey revealed that, as in all villages visited, very few households have only one source of income/livelihood. The main population parameters of Monsongan inhabitants are shown in more detail in Tables 4b to 4g below.

Table 4b - Population Density and Growth Monsongan

	Total Population	Population Density/km²	Population Growth Rate[10]	Households	Average Household size
MD	1,735	63	No data	No data	No data
BPS 2004a	1766	64	2.74%	406	4.3
BKKBN	1508	55	No data	366	4.1

The population growth is, based on the data in BPS 2004a, due to an excess of births over deaths, with a low level of emigration and no recorded inmigration.

Table 4c - Main Occupations Monsongan

MD	**Farming**	**Fishing**	**Labourer**	**Commerce**	**Civil Servant**	**Artisanal**
	215[11]	89	103	6	10	3
BPS 2003a	**Farming/Fishing**		**Industry**	**Commerce**	**PNS**	**Other**
	599		6	4	11	110

From Table 4c it can be seen that the number of people officially earning is greater than that recorded by the village Headman. This could be because the village records relate to households, not individuals. BPS data does not separate fishing and farming. However, although the village

[10] Average per year over the period 1997 to 2003
[11] 210 arable or plantation farmers, 5 livestock farmers

as a whole is dominated by farming, in Dusun III, the sub-village where all the ornamental fishers (and the Village head) live fishing is the main occupation of most people and the main ethnic group is Bajo.

Table 4d - Population by Sex and Religion Monsongan

	Male	Female	Sex Ratio F/M	Islam	Christian (All Denominations)
MD	856	879	1.03	No data	
BPS 2004a	875	891	1.02	1384 - 78%	383 - 22%
BKKBN	749	759	1.01	No data	

The sex ratio is close to 1, showing only a small excess of female over male inhabitants. Although there is a sizeable Christian minority, the Bajo fisherfolk are all Muslim.

Table 4e - Age class distribution Banggai District (BPS 2003a & BKKBN)

Pre-school 0-6	Primary 7-12	Secondary 13-18	Adult 19-54	Aged 55-74	Very Old >75
17%	13%	12%	50%	7%	1%
Working Age (15-55)	**Employed/ Working**	**Obligatory School Age (7-14)**	**Pre-school (0-6)**	**Old People (over 55)**	**Married People**
60%	46%	15%	17%	8%	35%
BKKBN Data	**Age 16 - 59**	**Pre-school 0-6**	**Age 7-15**	**60 and Over**	**Married Household Heads**
	835 - 55%	256 - 17%	381 - 25%	36 - 2%	321 - 88%

These figures show a relatively young population, with a high ratio of active to dependent population, but with increasing life expectancy and little likelihood of further reduction in population growth[12] at least short to medium term, the population is likely to continue to grow, putting extra pressure on resources.

Table 4f - Educational Attainment Monsongan

	Illiterate (Adults)	Primary School (didn't complete)	Primary School (completed)	Middle School	High School	University or Other Higher	Unknown/ Children
MD	> 1% (7)	4% (75)	21% (370)	9% (151)	6% (97)	None recorded	60%
BPS 2004a	No data	No data	44%	6%	4%	Under 1% (2)	46%

BPS 2003a	Primary School	Middle School	High School	University/ Other Higher
Age-group	279	99	69	No Data
Number & % Attending School	261 - 94%	55 - 55%	25 - 36%	No Data

BKKBN Data Educational attainment of household heads & School Attendance	Didn't complete Primary School	Completed Primary or Middle School	Completed High School or above	Children 7-15 in school	Children 7- 15 not in School
	113 - 31%	224 - 61%	29- 8%	323 - 85%	16% of Boys 14% of Girls

[12] 82% of married women of child-bearing age already participate in the government family planning scheme.

Although overall the level of school attendance is relatively high, few of the children from the Bajo fishing families are among those who continue to middle and high school. Fewer boys than girls continue, as it is easier for them to start earning. Education of household heads is below the average for Banggai District.

Table 4g - Socio-economic level of Monsongan Households [13]

	Unknown	**Poor Pra-Sejahtera**	**Borderline Sejahtera I**	**Average Sejahtera II**	**Well Off Sejahtera III**	**Well Off & Philanthropic Sejahtera III +**
BPS 2003a	27 - 7%	241 - 60%	118 - 29%	5 - 1%	12 - 3%	3 - <1%

BKKBN	**Poor Pra-Sejahtera Economic Reasons**	**Borderline Sejahtera I Economic Reasons**	**Average Sejahtera II**	**Well Off Sejahtera III**
	39 - 11%	4 - 1%	34 - 9%	15 - 4%
	Poor Pra-Sejahtera Other Reasons	**Borderline Sejahtera I Other Reasons**		**Well Off & Philanthropic Sejahtera III +**
	169 - 46%	103 - 28%		2 - 1%

The majority of Monsongan households live below the official poverty level or on the borderline. It was not possible to obtain from anyone a satisfactory explanation as to why so many people are considered below the poverty line for "non-economic" reasons, as observations and contact with people in Monsongan seemed to show that many (well in excess of 39 households) are indeed poor by economic standards, though they may not fulfil some of the other "pra-sejahtera" criteria, and that this data is possibly inaccurate. This "other" designation has very negative impacts on family welfare, as it can make them ineligible for many types of assistance, especially free or cheap rice and assistance with health and schooling. It is worth noting that payment of taxes (especially on property) is very low, with only 52% of taxes due actually collected (BPS 2003a). However there are some well-off people who could potentially be sources of capital for investment.

Services and Infrastructure

Services and infrastructure based on official records, local informants and observation are shown in Table 4h below. Data on housing and household facilities are given in Tables 4i and 4j.

Access to the village is generally by road. Public transport consists of minibuses which run several times a day on an irregular but fairly frequent schedule from Banggai, and can also be hired. However, although the 2,000 Rp fare each way is in objective terms not particularly expensive, in terms of local fishers incomes the cost is substantial and the journey is not undertaken for small items or small quantities. Three of these minibuses are locally owned, including one owned by the KD whose main function is transport of school children - income from which does not fully cover real costs of operation. There are around 20 motorbikes owned in the village, many of which work as ***ojek***, in order to cover the hire-purchase repayments. Most everyday items are purchased from the small local stores/stalls or ***kios***. People go to market in Banggai by public transport or in their boats. Fuel cost by ***katinting*** is probably similar to the cost of using public transport, but more people can travel, and more goods can be carried.

[13] . The official welfare category criteria are given in brief in Table 2 and in full in Appendix 6.

Table 4h - Services and Infrastructure in Monsongan

Item	BPS 2003a & 2004a	KI/FGD	Observation
Houses	295 houses declared fit for human habitation (111 fewer than no. of households)	Most fishers homes are lived in by considerably more than 4 people (the average "household" size). Most fishers houses built on stilts or artificial rock platforms (often from mined coral)	
Health	No clinic listed (2002) No Pharmacy 1 Nurse/Midwife 3 untrained Traditional Healers Family Planning[14]	Puskemas pembantu (clinic) with 1 nurse/midwife (***Bidan***)and 2 medical assistants Traditional Healer (***Dukun***) with some medical training Medicines: traditional, from clinic, buy from ***kios*** or Banggai	
Formal Education	Primary School	Primary School in village Secondary School in Banggai	
Electricity	Electricity from PLN and private sources (Generators)	24 hour supply from Banggai, very low power but also very cheap	Not to all homes
Basic Commodities	Weekly Market 7 ***Kios***	Use ***Kios*** and visit Banggai occasionally for selling and buying. No local market.	
Fresh water Supply	No mains water supply (PAM/PADM)	Water supply to a number of tanks, not all areas served. For many Bajo homes, water carried by sea or over causeways/walkways	
Sanitation	31 WC (average 1/57 people)	Not felt to be a priority	Most fishers houses use the sea (jamban)
Places of Worship	1 Mosque 1 Church	All ornamental fishers are Muslim Religion is an important, integral part of life	
Road Access	Served by a Kabupaten status tarmac road	Good, frequent public transport (minibuses), 2,000Rp (one-way), half price for schoolchildren (if in uniform)	
Access by Sea	No public sea transport	By private vessels, many houses have own jetty and small boat.	
Access within the Village		Many fishers houses only accessible via bamboo or plank walkways over the channels between houses. Increasing numbers of rock (often coral) walkways are being built.	
Fisheries Infrastructure	None	Ice - from Freezer in local collectors house Walled ponds and ***keramba*** (holding pens)	
Financial Services	None	Informal sector Tumbak + (previously also local collector)	
Communications	No Telephone 63 Televisions 34 Radios	Most people have access to Television and radio, even if often in someone else's house. Many more radios than in 2002 statistics. Radio and TV seen as important sources of information and entertainment.	

[14] 82% of married women of reproductive age are registered as using this service, 88% use the pill, 1% use implants, the remainder use injections (usually at 3 monthly intervals)

The fishing fleet is dominated by small dug-out canoes called ***sampan,*** often motorised with long-shaft outboards called ***katinting***, a term which is also often used for the whole craft (sampan and engine together). Most are around 5-6m long and between 45cm and 90cm wide, and some have outriggers (bamboo or occasionally wooden poles) on one or both sides for stability though not all. Indeed the sampan rented by the survey team did not have outriggers and was very "tippy", however it proved fairly stable even when climbing back onboard after in-water survey activities. These ***sampan***s, whether powered by ***katinting*** or by paddle/sail, are the usual type of craft used for all fishing activities, including post-harvest activities such as taking fish to market. Larger ***katinting***-powered or inboard vessels, usually built as a frame onto which planks are fitted, are called ***bodi***. See Appendix 2 (A2.5) for sea-going craft and their use. Many small boats (sampan) are owned by non-fishers or part-time fishers as well as by full-time fishers, and are used as much or more for travel to/from ***kebun***, meaning farms or plantations (generally under 2 hectares) as for fishing, whereas larger vessels tend to carry people and goods around the archipelago and are less often used for fishing unless equipped with compressors.

Table 4i - Housing in Monsongan (BPS 2003a)

Permanent	Semi-Permanent	Makeshift (Darurat)	Total	Liveable (Layak)	Households/ House (Avge)	Population/ House (Avge)
45 - 13%	79 - 21%	242 - 66%	366	295 - 81%	1.1	4.8

Although of non-permanent construction, many ***Darurat*** homes are considered fit to live in, but out of the total housing stock of 366, some 71 homes, or 19%, are considered unfit for human habitation by official standards. These would mainly be fisherman's houses, such as some of the stilt houses shown in Figure 10, and include the homes of a number of ornamental fish collectors. Photographs and video footage of living conditions are given in Appendix 2 and 7.

Table 4j - Household Facilities in Monsongan (BPS 2003a)

Electric Lighting	Kerosene Lighting	Television/ Radio	% Source of Electricity	Houses with WC	Wood for Cooking	Other Cooking Fuel
45% - 165 Houses	43% - 156 Households	63 TV 34+ Radio	PLN 96 - 62% Private 69 - 38%	31 8%	383 households 94%	23 households 6%

As for Bone Baru, radio ownership is much higher now than in the official figures from 2002, many battery operated, and many FGD participant fishers own one. However other figures are compatible with observation and conversations with villagers. Private electricity is from generators owned by villagers. Generally this electricity is only available for a certain number of hours per day, and is shared with a number of nearby houses for a small fee.

3.3.1.3 Tinakin Laut

Tinakin Laut was the most active village in the BCF ornamental fish trade in 2001 (Lunn & Moreau 2001), however the survey found that all ornamental fish collection has now ceased in this village, and the only remaining link to the OFT is acting as a base for some North Sulawesi (Tumbak village) buyers, who use a warehouse in Tinakin Harbour as an equipment store and very temporary holding/re-packing facility. The reasons for this are seen in Chapters 5, 6 and Appendix 3, and relate to the potential sustainability (or otherwise) of the ornamental fish trade.

Tinakin Laut is situated approximately 3 km from Banggai and can be easily reached by land or by sea from Banggai. Indeed, the village is immediately visible from the Regency Offices. By **ojek** the cost is IDR 2,000, and by minibus IDR 1,000 or 2,000. It is also possible to walk from Banggai to Tinakin Laut. The land area is 89% hilly and 11% flat, with much of the flat area being highly degraded and/or converted mangrove (Figure 10). The village itself is divided in two by a steep rocky spur (Appendix 7). There are 5 named islands, with land areas between 0.5

and 2 Hectares, one of which (opposite the main village, Appendix 7 and Figure 10) is inhabited. There are 3 Dusun or sub-villages, and the village has a land area of 1.43km², the second smallest in Banggai District, only 0.4% of the District land area, and has the highest population density of any Desa in Banggai District, even higher than any of the Banggai Town urban suburbs (Kelurahan). The majority of the population are of Bajo ethnic, and earn their livelihood from the sea. Tinakin Laut also has the highest poverty level (by percentage) of any village in Banggai District.

Profile data collected in this village was less complete than for Bone Baru or Monsongan, as it did not include data from the Monografi Desa, or so many inputs from observation and local sources, but is shown in Tables 5a to 5j below.

Table 5a - Land Use in Tinakin Laut (in Hectares)

Arable	Plantation	Urban	Unused	Other	Total	% Unused
59	12	7	19	46	143	13%

As can be seen the land area is minimal, and although 13% is unused, the free area is very small. All the plantation is coconuts. This limited number, with the low price of copra, will only be relevant as savings by using rather than buying.

Table 5b - Population density and Growth Tinakin Laut

Source	Total Population	Population density/km²	Population Growth Rate[15]	Households	Average Household Size
BKKBN	1284	898	No Data	317	4.1
BPS 2003a	1323	925	2.12%	278	4.8

The population growth is partly due to inmigration (no emigration), partly to excess of births over deaths. Household size is not a good indicator of numbers of people per house. In many Bajo fishing families several households live in each house, and many people who in reality are "dependants" are considered as separate family heads/households by official rules.

Table 5c - Main Occupations Tinakin Laut

	Farming/Fishing	Industry	Commerce	PNS	Other
BPS 2003a	254	44	23	12	223

One "other" is a policeman. Some "other" will be people working in nearby Banggai Town, but most will be part-time casual work by family members other than the Household Head. The statistics (BPS 2003a) do not split fishing and farming, but there very few farmers - available farming land could not support more than around 30-35 families. Over 80% of families depend primarily on fisheries, with other employment only bringing in small and usually irregular amounts of additional income. More information on local businesses is given in the Services and Infrastructure section below.

Table 5d- Population by Sex and Religion Tinakin laut

	Male	Female	Sex Ratio F/M	Islam	Christian
BPS 2003a	645	678	1.05	1323	0
	Male	**Female**	**Sex Ratio F/M**	**Religion**	
BKKBN	628	656	1.04	No data	

The sex ratio is close to 1 with a small excess of female inhabitants. All inhabitants are Muslim.

Table 5e - Age Distribution and Employment Tinakin Laut

[15] Average yearly growth over the period 1997 to 2002

BPS 2003a	Working Age 15 - 55	Employed or Working	Primary/Middle School Age 7-15	Pre-school and Old People	Married People
	690 - 52%	604 - 46%	306 - 23%	327 - 25%	516 - 39%
BKKBN	**16 - 59**	**Pre-school 0-6**	**7-15**	**60 and Over**	**Married Household Heads**
	552 - 43%	323 - 25%	346 - 27%	63 - 5%	260 - 82%

The data in Table 5e shows that there is a very high percentage of young people about to enter the work market and presumably get married and start families. Bajo people frequently marry as young as 13. With the restricted resources this is a potential problem.

Table 5f - Educational Attainment Tinakin Laut

Data from BPS 2003a	Primary School	Middle School	High School	University/ Other Higher	Unknown/ Small Children
Age-group	214	92	82	No Data	N/A
Attending school	213 - 100%	67 - 72%	56 - 69%	No Data	N/A
Graduated	489	145	84	6	599
% population	37%	11%	6%	< 1%	45%
BKKBN Data Educational attainment of household heads & School Attendance	**Didn't complete Primary School**	**Completed Primary or Middle School**	**Completed High School or above**	**Children 7-15 in school**	**Children 7- 15 not in School**
	99 - 31%	173 - 55%	45 - 14%	272 - 79%	30% of Boys 13% of Girls

The school attendance figures are quite high, which they should be with the proximity of Tinakin Laut to all levels of school up to High School. But far fewer boys than girls continue to middle (and therefore presumably high) school, because it is easier for them to obtain paying work at an early age. Significant numbers of adult who are household heads did not complete primary education, 31% is one of the highest percentage rates in Banggai District.

Wealth/welfare categories for Tinakin Laut are shown in Table 5g below.

Table 5g - Socio-economic Level of Tinakin Laut Households

BPS 2003a	Poor Pra-Sejahtera	Borderline Sejahtera I	Average Sejahtera II	Well Off Sejahtera III & IV
	241 - 87%	44 - 16%	11 - 4%	2 - <1%
BKKBN	**Poor Pra-Sejahtera Economic Reasons**	**Borderline Sejahtera I Economic Reasons**	**Average Sejahtera II**	**Well Off Sejahtera III**
	176 - 56%	25 - 8%	19 - 6%	3 - 1%
	Poor Pra-Sejahtera Other Reasons	**Borderline Sejahtera I Other Reasons**		**Well Off & Philanthropic Sejahtera III +**
	63 - 20%	31 - 10%		0

The data in Table 5g shows Tinakin Laut to be an exceptionally poor village, with very few people (7%) in the three higher wealth/welfare categories. This is almost certainly related to the dominance of fishery activities and lack of land-based resources. Fishing villages across

Sulawesi typically have a higher poverty level than farming villages. The reasons why this should be so, despite the extensive marine resources in many areas, including in Bangkep, which are often potentially far more valuable than small-scale farming or plantations, are discussed in the Livelihoods Analysis, Chapter 6.

Information on Services and infrastructure is given in Table 5h below, and data on housing and household facilities in Tables 5i and 5j.

Table 5h - Services and Infrastructure in Tinakin Laut

Item	BPS	KI/Observation
Formal Education	Primary School (8 teachers, 219 pupils)	Primary School Close to Middle and High Schools
Specific Education Facilities		Fisheries High School in Banggai
Basic Commodities		Kios in village Easy access to Banggai, especially by sea
Fresh water Supply	No mains supply (PAM or PDAM)	Unknown, good supply in KD house
Sanitation	9 WC	Most houses use the sea below the house
Health Care	1 Chemist Shop 1 midwife 1 paramedic 4 trained Dukun	No on-site clinic, but relatively easy access to main clinic facilities in Banggai including in-patient treatment, cost more of a barrier than physical access.
Places of Worship	1 Mosque	
Local Businesses	7 Carpenters 3 Tailors/Seamstresses 3 Weavers[16] 14 Kios	Dried fish production and making of cakes to sell also seen.
Road Access		Good, only 3km from Banggai Town centre
Access by Sea		There is a harbour, used extensively by wooden coaster vessels, including loading/unloading cargo from the Banggai - Luwuk ferries
Fisheries		Base for OFT trader from Tumbak
Communications	No telephone service	Information received through Radio (most own one) and TV (often in other people's houses)
Electricity	Electricity is supplied by PLN	Many people have electricity, which is felt to be cheap (cheaper than kerosene), once installed.

Table 5i - Housing in Tinakin Laut (BPS 2003a)

Permanent	Semi-Permanent	Makeshift (Darurat)	Total	Liveable (Layak)	Households/ House (Avge)	Population/ House (Avge)
16 - 6%	19 - 7%	216 - 87%	251	137 - 55%	1.11	5.3

Nearly half of Tinakin housing stock is considered unfit for human habitation. The number of people per house on average is higher than average for Banggai District. Typical houses in Tinakin Laut can be seen in Figure 10 and in the video clips in Appendix 7.

[16] Making tikar - a plaited carpet, or producing roofing materials from palm and other leaves

Table 5j - Household Facilities in Tinakin Laut (BPS 2003a)

Electric Lighting	Kerosene Lighting	Television/ Radio	% Houses with Electricity	% Houses with WC	Wood for Cooking	Kerosene for cooking
174 Houses	37% - 102 Households	94 TV 29 Radio	69%	4%	259 households 93%	5 households 2%

The data in Table 5j show that about one household in three has a Television, which is no doubt related to the high number of households connected to electricity which is of the same standard as in Banggai Town, unlike the relatively week supply in say Monsongan, more than to a higher level of income/wealth. Television is seen by many people in villages throughout Sulawesi as the most desirable consumer good, and the first they will purchase if any "windfall" money is available, as long as they have a reasonable electricity supply. Relatively speaking televisions are not particularly expensive, no more than say a suite of chairs or many other potential household improvements. However often a television also means investment in electricity generation, a much more expensive item, both at purchase and for maintenance and running costs. However, the number of households with a television is not much different from the total of households other than those considered poor for economic reasons, and this could be related.

3.3.1.4 Tolokibit

Tolokibit was not part of the original field survey plan, however a special trip was made to obtain data from this village once it was realised that this village had a different market chain from all those visited during the main survey expedition. It is almost impossible to reach Tolokibit by public transport, and therefore it was most fortuitous that the Fisheries Department staff were able to assist with the Department car.

Tolokibit is around 15km from Banggai Town, and consists of 2 Dusun. The inland Dusun, nearest to Banggai, can be reached by a good road, most of which is covered with tarmac. The coastal Dusun where all the fishers live, is a further 3 -4 km away along a dirt track road which can apparently become hard to pass in wet weather. Tolokibit is a recent village, until around 26 years ago it was mainly plantations where people came to work but very few people lived here. The Village Head (KD) lives in the main Dusun, where most of the services (such as the sub-clinic) are located, and the Sekdes or village secretary, effectively the second person in the chain of command at village level, lives in the coastal Dusun, called Dusun Tolokibit. The Sekdes, Pak Basrun Sasada, is also the co-ordinator and was the founder of ornamental fishing in the village. The main ethnic group is Banggai, with some Bajo fishers and other ethnic groups.

The land area is 61% hilly and 39% flat, with much of the flat area being covered in coconut plantations, while the hills are covered in other plantations. The total land area is 28.64 km². There is one river, Sunggai Tolokibit, from which the village takes it's name. There is one island nearby, Pulau Kenau, with an area of 235 Hectares. The BPS states this is part of Tolokibit Desa, but the Sekdes said that although he fishes there, the Toropot people consider they own the island. There were 25 families living there in 2002. Some of the coast is still fringed by mangroves. Seagrass beds and reefs near the village are in relatively good condition, though the reefs are being damaged by an unsustainable method of abalone collection in addition to more widespread causes (Figure 10, Appendix 7).

Profile data collected in this village was less complete than for Bone Baru or Monsongan, as it did not include data from the Monografi Desa (which both the KD and Sekdes said was held by the other) or so many inputs from observation and local sources, but is shown in Tables 6a to 6j below. Farming is the main income source for most Tolokibit villagers. The main seasonal crops are staple foods such as root vegetables (endemic ubi Banggai, cassava and sweet potato) maize

(sweet corn), and peanuts. The main plantation crops are, in order of production: coconut, cocoa, cloves, cashew nut, coffee, sago and candle-nut.

Table 6a - Land Use in Tolokibit (in Hectares)

Arable	Plantation	Urban	Unused	Other	Total	% Unused
502	1944	15	317	86	2864	11%

As can be seen the land area is extensive, and the area under cultivation exceeds 7 Hectares per family. Although unused land is relatively limited, the resources should be capable of sustaining the existing and even increased population, if all families have a reasonable access. However information on land distribution was not available. The "Other" includes 28 Hectares of State owned forest.

Table 6b - Population density and Growth Tolokibit

Source	Total Population	Population density/km²	Population Growth Rate[17]	Households	Average Household Size
BKKBN	1234	43	No data	310	4
BPS 2003a	1167	41	4.67	189/295	6.2

The population growth is mainly due to inmigration (no emigration), partly to excess of births over deaths. The data from BPS and BKKBN are very different, especially in terms of household size and number. The BPS data for household numbers is different on different pages!

Table 6c - Main Occupations Tolokibit

BPS 2003a	Farming/Fishing	Industry	Commerce	PNS	Other
	369	15	4	16	80

As the BPS does not separate fishers and farmers, this is not very revealing. According to the Sekdes there are both Bajo fishers (full-time) and Banggai fisher/farmers in Tolokibit Dusun, but apart from the ornamental fishers (20) he could not give numbers.

Table 6d- Population by Sex and Religion Tolokibit

BPS 2003a	Male	Female	Sex Ratio F/M	Islam	Christian
	614	553	0.9	1000	167
BKKBN	**Male**	**Female**	**Sex Ratio F/M**	**Religion**	
	686	548	0.8	No data	

The sex ratio is under 1 with a significant (and unusual) excess of male inhabitants, possibly single plantation workers. The population is mainly Muslim, with similar numbers of Catholic and Protestant Christians.

Table 6e - Age Distribution and Employment Tolokibit

BPS 2003a	Working Age 15 - 55	Employed or Working	Primary/Middle School Age 7-15	Pre-school and Old People	Married People
	812 - 70%	535- 46%	233 - 20%	122 - 10%	565 - 48%
BKKBN	**16 - 59**	**Pre-school 0-6**	**7-15**	**60 and Over**	**Married Household Heads**
	707 - 57%	268 - 21%	234 - 19%	25 - 2%	289 - 93%

[17] Average yearly growth over the period 1997 to 2002

The data in Table 6e show a very big difference between the two sources in terms of age distribution. Whichever is more accurate, it is a population dominated by working age adults.

Educational attainment data are shown in Table 6f below.

Table 6f - Educational Attainment Tolokibit

Data from BPS 2003a	**Primary School**	**Middle School**	**High School**	**University/ Other Higher**	**Unknown/ Small Children**
Age-group	182	51	44	No Data	N/A
Attending school	179 - 94%	42 - 82%	12 - 27%	No Data	N/A
Graduated	477	49	22	3	616
% population	41%	4%	2%	<1%	53%
BKKBN Data Educational attainment of household heads & School Attendance	**Didn't complete Primary School**	**Completed Primary or Middle School**	**Completed High School or above**	**Children 7-15 in school**	**Children 7- 15 not in School**
	53- 17%	236 - 76%	21 - 7%	183 - 78%	23% of Boys 21% of Girls

Overall the population is relatively well educated, by local standards, and there is very low illiteracy. There is a middle school in the upper village, which accounts for high attendance to this level - though it is a long walk for pupils from the coastal Dusun Tolokibit, and according to the Sekdes few children from this Dusun (which means few fisher family children) continue after primary school.

Table 6g - Socio-economic Level of Tolokibit Households

BPS 2003a	**Poor Pra-Sejahtera**	**Borderline Sejahtera I**	**Average Sejahtera II**	**Well Off Sejahtera III & IV**
	139 - 47%	144 - 49%	11 - 4%	1 - <1%
BKKBN	**Poor Pra-Sejahtera Economic Reasons**	**Borderline Sejahtera I Economic Reasons**	**Average Sejahtera II**	**Well Off Sejahtera III**
	134 - 43%	58 - 19%	14 - 5%	1 - <1%
	Poor Pra-Sejahtera Other Reasons	**Borderline Sejahtera I Other Reasons**		**Well Off & Philanthropic Sejahtera III +**
	10 - 3%	93 - 30%		0

The wealth/welfare category data given in Table 6g shows Tolokibit to be a poor village, with very few people (6%) in the three higher wealth/welfare categories. However the non-economic reasons for 30% of people being only just above the poverty line (Sejahtera I) rather than in higher categories is revealing, and consistent with observation, where at least a third of houses are above average for Sulawesi.

Information on Services and infrastructure is given in Table 6h below, and data on housing and household facilities in Tables 6i and 6j. There are four motorbikes owned in the village but no cars. Public transport usually comes around 4 times a day but often does not go beyond the upper village, so people in Dusun Tolokibit often have to wait several days for public transport. This is a big problem for people who need medical care and means school children going beyond primary school have to live away from home.

Table 6h - Services and Infrastructure in Tolokibit

Item	BPS	KI/Observation
Formal Education	2 Primary Schools (10 teachers, 200 pupils)	Primary School Middle School in upper village
Specific Education Facilities		Fisheries High School in Banggai
Basic Commodities	7 Kios No market	
Fresh water Supply	No mains supply (PAM or PDAM)	Water supply system built by PKK, but in dry weather the source is not strong enough to reach the tanks nearer the shore, and many people are forced to revert to wells, some brackish or of poor quality (Figure 10, Appendix 2).
Sanitation	10 WC	Most houses use the sea below the house
Health Care	1 Sub-Clinic 1 midwife 1 trained Dukun 2 untrained Dukun	Sub-clinic in upper village in good order, but the nurse/midwife who is supposed to be stationed in the coastal Dusun stays in the upper village and only comes about once per six months to the coastal Dusun, so fisher families usually have to rely on Dukun.
Places of Worship	2 Mosques 2 Churches	One Mosque in each Dusun One Church for each Denomination
Local Businesses	3 Carpenters 2 Tailors/Seamstresses 3 Weavers[18]	
Road Access		Good to upper village, poor to coastal Dusun.
Access by Sea	No public boats	By private boat only
Fisheries		Keramba for BCF
Communications	No telephone service	Information received through Radio (many own one) and TV (often in other people's houses)
Electricity	Electricity is supplied by PLN	Many people have electricity, which is felt to be cheap (cheaper than kerosene), once installed.

Fishing vessels are mainly small sampans, some fitted with katinting, but there are some larger vessels, including the squid fishery boats which regularly take at least 8 people on a fishing trip.

Table 6i - Housing in Tolokibit(BPS 2003a)

Permanent	Semi-Permanent	Makeshift (Darurat)	Total	Liveable (Layak)	Households/ House (Avge)	Population/ House (Avge)
29 - 11%	37 - 14%	197 - 75%	263	196 - 75%	0.7 to 1.3	4.4

The data are obviously out of date, as far more than 29 permanent houses were seen. The figure of 75% houses being fit for human habitation is probably not far from reality, and could even be higher than this. However, some fisher and fisher/farmer houses seen were of poor standard. The households per house varies greatly depending on which household number data source is chosen.

[18] Two making tikar - a plaited carpet, or producing roofing materials from palm and other leaves, one weaving using a mechanised process.

Table 6j - Household Facilities in Tolokibit (BPS 2003a)

Electric Lighting	Kerosene Lighting	Television/ Radio	% Houses with Electricity	% Houses with WC	Wood for Cooking	Cook with Kerosene
76 Houses	74% - 211 Households	29 TV 24 Radio	29%	4%	275 - 93% households	4 - 2% households

As for all villages, number of radios is higher than in the BPS data. Most people use wood for cooking, a fact which as elsewhere threatens remaining mangrove and other forests. However many people also actually use coconut husks and shells as well, a very plentiful resource here.

3.3.1.5 Banggai Village Scenes - Figure 10

Poor Fishers Dwelling

Focus Group Discussion

Cyanide Demonstration

Better Off Villager's House

Beach - with Coastal Abrasion

Village Offices - rebuilt by Army

Figure 10a - Bone Baru Scenes

Traditional stilt houses

House on coral platform & mined coral in boat

Bajo Women

Boat Building

Water Supply

Bajo Children at play

Figure 10b - Monsongan Scenes

Typical Houses & Jetty

Tinakin Island

Village head Pak Mudir

Views of Tinakin Laut from Bupati's Office

Lobster Fishing Family

Figure 10c - Tinakin Laut Scenes

Tolokibit Bay& Kenau Island

Tolokibit Beach & Fisher Family's Houses

The Mosque and Main Street

Fisher Family Children

Building with mined coral

Figure 10d - Tolokibit Scenes

Don Mery Hotel - Team Base

Street scenes with ojeks, street sellers, mined coral...

Don Mery Evening Meal

Martabak pancakes and fragrant woven katupat to be filled with rice

The Market

General stores selling katinting propellers (left) and Kerosene in drum (right)

Figure 10c - Banggai Town Scenes

3.3.2 Bokan Kepulauan District (Panapat, Toropot)

In 2001 there were 4 villages actively involved in the BCF ornamental fishery, with two apparent modes of trading. Of these, two villages, Panapat and Toropot, were selected, one with each trading mode in 2001. Indeed, the trade chains from these two villages in 2004 did turn out to be very different. Because of limited time and the presence of seaweed culture, transects were not laid, and the swim survey method was used. The villages where livelihood surveys were conducted and biophysical survey locations are shown in Figure 11 opposite. The District capital Bungin is also shown.

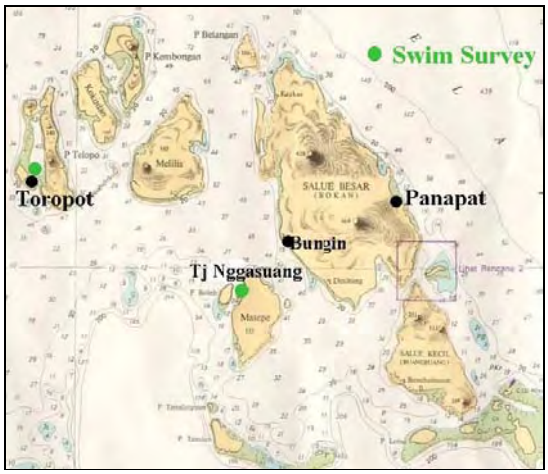


Figure 11 - Survey Locations in Bokan Kepulauan District

Official wealth categories have already been defined in Table 2 above (and in detail in Appendix 6). Figure 12 below shows the wealth/welfare categories for Bokep (in red) and for each of the survey villages.

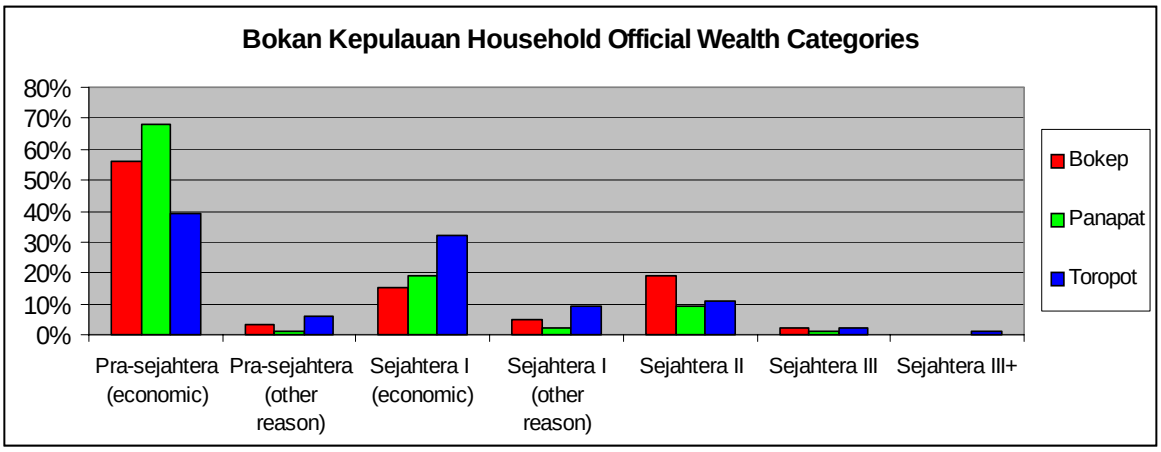


Figure 12 - Wealth/Welfare in Bokan Kepulauan District

These data show that the vast majority of the population are either below (45%) or only just above (41%) the official poverty line. The two target villages have below average numbers of the Sejahtera II class - better off people. Panapat has particularly high numbers of poor people.

Bokan Kepulauan has a vastly less developed infrastructure than Banggai District, not just because of the relative geographical isolation but also because previously it was a neglected part of a larger administrative unit, and unlike Banggai has not had the advantages which have accrued through being the capital of the Regency since 1999 and through having a relatively major port, including a regular scheduled PELNI line. However, Bokep has made a lot of progress and is endeavouring to increase both infrastructure and welfare. The District owns one of the 5 Government owned Speed Boats in the Archipelago, and reputedly uses this for purposes associated with promoting development.

Official statistics for Bokep District are much less complete than for Banggai District, therefore the data below are less detailed than for the four previous villages. Pictures showing the survey villages and Bokep area are given in Figure 13 after the individual village profiles, and video clips can be viewed in Appendix 7.

3.3.2.1 Panapat

Panapat was a major trading centre in 2001, with links to both Bali and Tumbak and an organised fishers group (Lunn & Moreau 2001). The Fisheries Department said it was the major centre for ornamental fish trade with Bali. Images of Panapat can be seen in Figure 13.

Panapat Desa is one of 5 villages situated on Bokan Island, also called Salue Besar, the largest island in BOKEP (Bokan Kepulauan) Kecamatan (District), which is comprised of 12 villages (Anonymous 2002b). There are 4 Dusun or sub-villages. The total land area is 37.82 km². Approximate co-ordinates are : 1° 59' 26" S, 123° 51' 42" E[19]. Panapat is on the eastern side of Bokan, 5 km from the Kecamatan (District) capital, Bungin, situated on the Western side of Bokan Island, and 25 km as the crow flies from the provisional Regency capital Banggai. Both are only accessed by sea, as there is no road between Bokan and Bungin (Anonymous 2003), even though BPS 2003b says that Panapat can be reached from Bungin by land transport.

The topography is mainly hilly, though below 500m, with the highest peak at 464m (Dinas Hidro-Oseanografi 1985). One smaller island is part of Panapat Village, Pulau Lambuang-

[19] GPS field data

mbuang, with an area of 1754 Hectares and 190 resident families. Land-use is shown in Table 7a below.

Table 7a - Land-Use in Panapat (in Hectares)

Arable	Plantation	Urban	Unused	Forest	Total	% Unused
459	596	26	561	2140	3782	15%

The supposed "people's forest" (hutan rakyat) officially covers most of the land. However in reality there is little forest left on Bokan Island, as could be seen from the sea and was confirmed by a wood trader who recently surveyed the area. Most has been cleared for either seasonal or plantation crops, or is covered in often thin or patchy scrub, and it is clear that much of the area is at high risk of erosion and becoming "lahan kritis" or critical land, where the top soil has gone and little can be grown. This clearance clearly threatens fresh water resources, as well as posing a threat to the shallow-water marine ecosystems (through sedimentation). The seasonal crops produced are mainly starchy root vegetables (cassava, sweet potato and endemic ubi Banggai), maize (sweetcorn) and a few vegetables; cash crops in order of production volume are: coconut (copra), cloves, cocoa, cashew nut and coffee.

Population Data

The village profile which should be maintained by every village head as a statutory duty was not complete, as for most villages the team members have visited during this project and on other projects throughout Central Sulawesi. Data shown is from 3 sources, the BKKBN, reputed to have the most accurate data, the village records or Monografi Desa (MD), and the official statistics from the BPS (BPS 2003b and 2004b).

No data on religion is available, though for Bokep as a whole the population is 87% Islam, 13% Christian with no other religions listed. The main ethnic is Banggai, with some Bajo and other, mainly Sulawesi, ethnics. The reported main occupations, age/sex distribution, educational attainment and socio-economic level of the inhabitants are shown in tables 7b to 7g below. More information is available in Appendix 5.

Table 7b - Population density and Growth Panapat

Source	Total Population	Population density/km²	Population Growth Rate[20]	Households	Average Household Size
MD	2,500	66	No data	410	6.1
BKKBN	1648	44	No Data	386	4.3
BPS 2003b	1651	44	1.02	361/375	4.6/4.4

The BKKBN and BPS data is similar, though the BPS has different household numbers on different pages! However village records show a much higher population of 2,500, of which 1,700 are registered voters. However, as Panapat is about to be divided into 2 villages, with Dusun Mandel becoming an independent village, the higher figure may well be more accurate.

Table 7c - Main Occupations Panapat

Source	Farming	Fishing	Traders	Small Industry	Other
Village Records	60%	35%			
BPS 2003b	309		14	4	34

The Bokep data does not show PNS (civil servant) numbers, unlike Banggai District. Although these are main livelihoods, many households have more than one occupation, in particular a high proportion are fisher/farmers, which dominates may depend mainly on current opportunity.

[20] Average yearly growth over the period 1995 to 2002

Table 7d - Population by Sex Panapat

Source	Female	Male	Sex Ratio F/M	%Male/Female Household Heads
BPS 2002b	828	823	1.01	
BKKBN	827	821	1.01	91% / 9%
Village Records	60%	40%	1.5	N/A

Once again there is a vast and unexplained discrepancy between the village records and the official statistics. However in such an island community it is normal for many of the younger men to work away - often for months or even years at a time, and when discussing the seasonal calendar several people said that in the dry season many young people, mainly men, leave to seek opportunities and often do not return, so this could be one reason. It would also explain the difference in numbers, with these people being registered by the Village Head (e.g. for voting purposes, or obtaining identity cards) but not by other officials such as BKKBN staff because of them not being physically present. There is a much higher than average percentage of adults with KTP (identity cards) and birth certificates (21% and 22% respectively). These are usually requested when leaving the village, as a prerequisite for use of many public transport services especially if crossing "trouble spots" such as the Poso area, and for obtaining employment.

Although (unusually) the Bokep District data does not give information on religion per village, other than the number of Mosques (4) and Churches (1), the Village head said that Mandel Dusun is more mixed, while the other 3 Dusun are predominantly or entirely Muslim.

Table 7e - Age Distribution & Marital Status Panapat

BPS 2003b	**7-12**	**13-15**	**16-18**	**Other**	
	264 - 16%	110 - 7%	109 - 7%	1168 - 70%	
BKKBN	**16 - 59**	**Pre-school 0-6**	**7-15**	**60 and Over**	**Married Household Heads**
	688 - 42%	385 -23%	513 - 31%	62 - 4%	339 - 88%

According to BKKBN there are significantly more 7-15 year olds than in BPS 2003b. The BKKBN figures show a young population with over half below 15, which is consistent with impressions from visiting the village.

The data in Table 7f below show a relatively high middle school continuation rate for a village with no middle school. These children will all have to live away from home, usually with relatives, but could still stay on Bokan Island, as there are STLP schools in Bungin and Kaukes villages. High School means moving to Banggai or Peleng Islands, or further afield (e.g. to Luwuk). This is one reason for low High School attendance. There is very low illiteracy in Panapat, even though few people have progressed beyond Middle School (most FGD members had completed Primary school and all were literate and numerate) and this trend seems likely to continue. The current primary school attendance rate of 100%, if accurate, is impressive.

Table 7f - Educational Attainment Panapat

BPS 2003b School	**Primary School**	**Middle School**	**High School**	**University/ Other Higher**	
attendance	264 - 100%	57 - 51%	6 - 6%	No Data	
BKKBN Data Educational attainment of household	**Didn't complete Primary School**	**Completed Primary or Middle School**	**Completed High School or above**	**Children 7-15 in school**	**Children 7- 15 not in School**
heads & School Attendance	36 - 9%	327 - 85%	23 - 6%	383 - 75%	23% of Boys 28% of Girls

No wealth/welfare data was available from the village head, but the BKKBN and BPS 2003b did have poverty level data which is shown in Table 7g below. The number of households below the official poverty line is very high, and as in most coastal villages throughout Indonesia, many of these households have fishing as the main or sole occupation. However data collected during the survey revealed that very few households have only one source of income/livelihood.

Table 7g - Socio-economic Level of Panapat Households

BPS 2003b	**Poor Pra-Sejahtera**	**Borderline Sejahtera I**	**Average Sejahtera II**	**Well Off Sejahtera III**
	253 - 67%	96 - 27%	21 - 5%	5 - 1%
BKKBN	**Poor Pra-Sejahtera Economic Reasons**	**Borderline Sejahtera I Economic Reasons**	**Average Sejahtera II**	**Well Off Sejahtera III**
	262 - 68%	75 - 19%	36 - 9%	5 - 1%
	Poor Pra-Sejahtera Other Reasons	**Borderline Sejahtera I Other Reasons**		**Well Off & Philanthropic Sejahtera III +**
	2 - <1%	6 - 2%		0

Having a number of better off people, even if only 6-10%, does mean a possibility of local investment, at least on a small scale, but the majority of the population is below the poverty line.

Services and Infrastructure:

Panapat has a jetty which is useable in most weather conditions, and there are daily public boat services from Banggai, often more than one per day. There is no motorised transport as there are no roads outside the village, however paths within the village are mainly well kept and Panapat gives an impression of being orderly and cared for. The new Mosque being built on the hill overlooking the village and jetty is impressive, and according to the Village Head much of the funds have come from the proceeds of the ornamental fish trade. The kios in Panapat shown in Figure 13 was the best kept and best stocked seen during the survey. Although by official standards poverty is high, there was an impression that welfare levels were higher than the figures would suggest. The recently installed water system was still a novelty and a much appreciated improvement in lifestyle for locals, many were seen exuberantly washing during the brief visit. There seem to be a lot of quite recent improvements/buildings.

Table 7h - Services and Infrastructure in Panapat

Item	BPS	KI/FGD	Observation
Formal Education	4 Primary Schools (1 teacher*[21],313 pupils)	Primary School	
Basic Commodities	No Market	Most basics purchased from Kios	Several Kios operational
Fresh water Supply	No mains supply (PAM or PDAM)	A fresh water supply has recently been installed, but does not yet serve all areas.	
Sanitation	19 WC	Minimal, but by far the highest number for any village in Bokan.	

[21] Most likely only one Civil Servant, other teachers probably "honor" or people wanting to become civil servants working for almost nothing in order to qualify for the selection process.

Table 7h - Services and Infrastructure in Panapat (Continued)

Item	BPS	KI/FGD	Observation
Health Care	Puskesmas Pembantu Clinic, with one Nurse/midwife Family Planning[22]	People use the Village Nurse/Midwife's services Medicines from Kios and traditional healers Doctor in Banggai In-patient clinic recently opened in Bungin	
Places of Worship	4 Mosques 1 Church	Religion is an important part of life, and religious festivals are community events	
Local Businesses	Electricity/Water 3 Transport 5 Small Industry 4 Trade 14 Services 26	Several kios	
Road Access	To Bugin	None, only tracks	
Access by Sea	6 public transport boats based in Panapat	3 regular public boats	Jetty
Fisheries Infrastructure	None	Used to be holding pens (ornamental fish) Seaweed culture equipment	
Communications	No telephone service	Village head has a satellite phone Information received through Radio (many own one) and TV (usually in other people's houses)	
Electricity	No official supply	The village head and two other people have generators. The village head supplies the mosque, all supply a few other homes.	

Number and types of housing and household facilities based on official statistics (BPS 2003b) are shown in table 7i and 7j.

Table 7i - Housing in Panapat (BPS 2003b)

Permanent	Semi-Permanent	Makeshift (Darurat)	Total	Liveable (Layak)	Households/ House (Avge)	Population/ House (Avge)
67 - 18%	39 - 10%	273 - 72%	379	30 - 3%	0.98	4.4

According to the statistics, very few people in Panapat have acceptable housing. However, a much higher number of homes in reasonable condition were seen, well over the 30 from BPS, suggesting that since 2002 there has been an improvement in livelihood levels or that the official criteria for "layak" do not correspond with the team's subjective perception. However a large number of basic stilt traditional houses were seen especially in the outlying Bajo dominated Dusuns which were only seen from the sea, without visiting. The excess of housing over households, at odds with observation of large numbers of people per house, could well be due to the nature of traditional Bajo life, where families often more between locations, using makeshift stilt houses. This type of housing in itself is not necessarily an indicator of poverty, but of a traditional lifestyle to which many relatively well off Bajo may still adhere.

Table 7j - Household Facilities in Panapat (BPS 2003b)

Electric Lighting	Kerosene Lighting	Television/ Radio	% Houses with Electricity	% Houses with WC	Wood for Cooking	Unknown Cooking Fuel
122 Houses	68% - 253 Households	9 TV 20 Radio	32%	5%	No data	No data

[22] According to BPS, 153 women use the Family Planning, or 55% of married women of reproductive age.

All the electricity is from private generators. Pak Rahman the village Head owns the largest generator which supplies several nearby houses for a small fee, usually from 6pm to midnight, and also supplies the Mosque. Other better-off people in the village also have generators, though smaller, and supply neighbours in a similar way.

The number of radios is definitely out of date, and is far higher. From the FGD the majority of families have a member who owns one. It is also highly likely there are more TVs, though the tell-tale dishes were not counted. Although there is no data on cooking fuel in the Bokep statistics, it was clear during our visit that wood is the main source of fuel, and used for water heating and other basics such as rice, even in families where kerosene stoves are owned and used for frying and more involved cooking. This is clearly a major pressure on local resources. There are mangrove forest remaining, although only seen in passing, but clearly these were once more extensive.

3.3.2.2 Toropot

Toropot was an active BCF collecting centre in 2001, with links to Tumbak, and no fishers organisation. The Fisheries Department thought there was still ornamental fish collection taking place there. Images of Toropot can be seen in Figure 13.

Toropot Desa is one of 12 villages in Bokep (Bokan Kepulauan) District and consists of 7 Islands, the largest of which is also called Toropot and is mainly hilly, though not mountainous, with the highest peak at 140m (Dinas Hidro-Oseanografi 1985). There are 2 Dusun or sub-villages, the main Dusun which was visited is on the small island of Loi-Loi which is seemingly entirely covered in houses and the paths between them, with a very high population density. The total land area is 13.84 km². The Islands, their population levels and land-use are shown in Tables 7a and 7b below (all areas in hectares). GPS data is not available for Toropot, but from the navigation chart (Dinas Hidro-Oseanografi 1985) approximate co-ordinates are 1° 57' 30" S and 123° 38' 30" E . Toropot is around 10 km from the Kecamatan (District) capital, Bungin, situated on the Western side of Bokan Island, and 25 km as the crow flies from the provisional Regency capital Banggai. There is an extensive lagoon between Toropot Island and some of the smaller islands, with seagrass and coral growing, and which is used for seaweed culture.

Table 8a - Islands in Toropot (BPS 2004b)

Name	Toropot	Loi-Loi	Toropot Pauno	Batu Ampas	Tumbak Besar	Tumbak Kecil	Tatang korak
Area	1063	20	240	62	300	65	375
Families	40	270	37	3	4	2	3
Population	202	1133	112	15	12	10	15
Population Density/km²	19	5665	47	24	4	15	110

Table 8b - Land-Use in Toropot (BPS 2004b)

Land Use	Arable	Plantation	Urban	Unused	Forest	Total
Area (Hectares)	62	176	14	83	1049	1384

The supposed "people's forest" (hutan rakyat) officially covers most of the land. However in reality there is little forest left on Toropot Island, as could be seen from the sea and was confirmed by a wood trader who recently surveyed the area and said all valuable wood had been extracted. Most is covered in often thin or patchy scrub, and it is clear that much of the area is at high risk of erosion and becoming "lahan kritis" or critical land, where the top soil has gone and little can be grown. This situation clearly threatens fresh water resources, as well as posing a threat to the shallow-water marine ecosystems (through sedimentation).

The few seasonal crops produced are mainly starchy root vegetables (cassava, sweet potato and endemic ubi Banggai), maize (sweet corn) and a few vegetables; cash crops in order of production volume are: coconut (copra), by far the dominant crop, with a few cashew nut, cloves, and coffee.

Population Data

The village profile was not available, as the Village head was in Banggai (Town or island?) and no-one else knew where it was kept. Data shown is from 2 sources, the BKKBN, reputed to have the most accurate data, and the official statistics from the BPS (BPS 2003b and 2004b).

No data on religion is available, though for Bokep as a whole the population is 87% Islam, 13% Christian with no other religions listed. The main ethnic is Bajo, with some Banggai and other, mainly Sulawesi, ethnic groups represented. The reported main occupations, age/sex distribution, educational attainment and socio-economic level of the inhabitants are shown in tables 8c to 8h below. More information is available in Appendix 5.

Table 8c - Population density and Growth Toropot

Source	Total Population	Population density/km²	Population Growth Rate[23]	Households	Average Household Size
BKKBN	1242	89	No Data	295	4.2
BPS 2004b	1278	92	3.52		

The BKKBN and BPS data is similar, though the BPS has different household numbers on different pages! However village records show a much higher population of 2,500, of which 1,700 are registered voters. The growth is mainly due to excess of births over deaths although there was some inmigration.

Table 8d - Main Occupations Toropot

Source	Farming	Fishing	Traders	Small Industry	Other
BPS 2004b	228		5	3	16

The Bokep data does not show PNS (civil servant) numbers, unlike Banggai District. The BPS data does not separate farming and fishing. However, the BPS does give Fishing as the main income source for the majority of households in Toropot, and information from local people confirmed that most earn their living either mainly or totally from marine resources, mainly fishing and seaweed cultivation. The "Other" category covers 2 providers of electricity or water, 2 transport providers (by sea) and 12 service providers (unspecified services).

Table 8e - Population by Sex Toropot

Source	Female	Male	Sex Ratio F/M	%Male/Female Household Heads
BPS 2004b	623	655	0.95	
BKKBN	595	648	0.91	92% /8 %

There is an excess of male over female population, for which the reason is not clear.

Although (unusually) the Bokep District data does not give information on religion per village, other than the number of Mosques (2) and Churches (0), the Bajo fisher community is entirely Muslim.

[23] Average yearly growth over the period 1995 to 2002

Table 8f - Age Distribution & Marital Status Toropot

BPS 2003b	**7-12**	**13-15**	**16-18**	**Other**	
	185 - 15%	85 - 7%	83 - 7%	1498 - 71%	
BKKBN	**16 - 59**	**Pre-school 0-6**	**7-15**	**60 and Over**	**Married Household Heads**
	646 - 52%	222 - 18%	322 - 26%	52 - 4%	267 - 91%

In BPS 2003b there are significantly more 7-15 year olds than according to the BKKBN. The BKKBN figures show a young population, which is consistent with impressions from visiting the village.

The data in Table 8g below show a low middle school continuation These children will all have to live away from home, usually with relatives, and on a different Island. The nearest STLP schools are in Bungin and Kaukes villages. High School means moving to Banggai or Peleng Islands, or further afield (e.g. to Luwuk). This is one reason for extremely low High School attendance. There is very low illiteracy in Toropot, even though few people have progressed beyond Middle School (most FGD members had completed Primary school and all were literate and numerate) and this trend seems likely to continue. The current primary school attendance rate of 100%, if accurate, is impressive, as for Panapat. More boys than girls leave school early to earn a living, as in other Bajo villages such as Tinakin.

Table 8g - Educational Attainment Toropot

BPS 2003b School attendance	**Primary School**	**Middle School**	**High School**	**University/ Other Higher**	
	185 - 100%	27 - 32%	1 - 1%	No Data	
BKKBN Data Educational attainment of household heads & School Attendance	**Didn't complete Primary School**	**Completed Primary or Middle School**	**Completed High School or above**	**Children 7-15 in school**	**Children 7- 15 not in School**
	12 - 4%	275 - 93%	8 - 3%	281 - 87%	17% of Boys 9% of Girls

The BKKBN and BPS 2003b poverty level data is shown in Table 8h below. The number of households below the official poverty line is very high, and most of these households have fishing as the main or sole occupation.

Table 8h - Socio-economic Level of Toropot Households

BPS 2004b	**Poor Pra-Sejahtera**	**Borderline Sejahtera I**	**Average Sejahtera II**	**Well Off Sejahtera III/II+**
	65 - 24%	165 - 59%	43 - 15%	5 - 2%
BKKBN	**Poor Pra-Sejahtera Economic Reasons**	**Borderline Sejahtera I Economic Reasons**	**Average Sejahtera II**	**Well Off Sejahtera III**
	116 - 39%	94 - 32%	32 - 11%	6 - 2%
	Poor Pra-Sejahtera Other Reasons	**Borderline Sejahtera I Other Reasons**		**Well Off & Philanthropic Sejahtera III +**
	18 - 6%	27 - 9%		2 - 1%

There are significant discrepancies between the two data sources. However the trends are similar. Based on this data, Toropot has a relatively low number of households below the poverty line

(for Bangkep). The high number of people involved in seaweed farming would seem to be related to the reduced poverty levels. There are still however a significant number of poor people in Toropot, most of them fisherfolk with no livelihoods other than marine resource exploitation, and the majority of the remainder of the population is largely only just above the poverty line and therefore vulnerable. The above average number of better off people is potentially a resource for development.

Services and Infrastructure:

Table 8i - Services and Infrastructure in Toropot

Item	BPS	KI/FGD	Observation
Formal Education	1 Primary School (7 teachers,278 pupils)	Primary School	
Basic Commodities	No Market	Most basics purchased from Kios Market in progress during visit	
Fresh water Supply	No mains supply	Fresh water is a concern	
Sanitation	2 WC	Most houses over the water, use holes in the floor	
Health Care	No clinic Family Planning[24]	Medicines from Kios and traditional healers Doctor in Banggai In-patient clinic recently opened in Bungin	
Places of Worship	2 Mosques		
Local Businesses	Electricity/Water 2 Transport 2 Small Industry 3 Trade 5; Services 12	Several kios Dried fish	
Road Access	To Bugin	None, only tracks	
Access by Sea	2 public transport boats based in Toropot	Most houses have a jetty or platform where boats can be tied and people/goods can enter/leave them	
Fisheries	None	Seaweed culture equipment	
Communications	No telephone service	Information received through Radio (many own one) and TV (usually in other people's houses)	
Electricity	No official supply	Two people have generators which supply a number of other homes.	

Toropot lagoon provides a safe harbour in almost all weather conditions, although as the team discovered, at low tide larger vessels may be at risk of being grounded until the next high tide. There are daily public boat services from Banggai, sometimes more than one per day. There is no motorised transport as there are no roads. Although officially there is no market, one was in progress during the survey (see Figure 13). Most households own a vessel of some description, usually a sampan, with or without katinting outboard.

Number and types of housing and household facilities based on official statistics (BPS 2003b and 2004b) are shown in table 8j and 8k.

Table 8j - Housing in Toropot (BPS 2004b)

Permanent	Semi-Permanent	Makeshift (Darurat)	Total	Liveable (Layak)	Households/ House (Avge)	Population/ House (Avge)
7 - 3%	6 - 2%	234 - 95%	247	48 - 98%	1.2	5.2

According to the statistics, very few people in Toropot have acceptable housing. The majority of homes are basic stilt traditional Bajo houses This type of housing in itself is not necessarily an

[24] According to BPS 2003b, 151 women use the Family Planning, or 70% of married women of reproductive age.

indicator of poverty, but of a traditional lifestyle to which many relatively well off Bajo may still adhere. However the quality of construction, the contents of the houses or the amount of gold worn by female family members will give a better indication. Unfortunately it was not possible to undertake this sort of survey at this site due to having to leave before the speed boat became grounded by falling tide and before weather conditions would have made return to Banggai dangerous if not impossible.

Table 8k - Household Facilities in Toropot (BPS 2003b)

Electric Lighting	Kerosene Lighting	Television/ Radio	% Houses with Electricity	% Houses with WC	Wood for Cooking	Unknown Cooking Fuel
78 Houses	69% - 170 Households	4 TV 8 Radio	31%	<1%	No data	No data

The number of radios is definitely out of date, and is far higher. From the FGD, as in other villages the majority of families have a member who owns one. It is also highly likely there are more TVs, though the tell-tale dishes were not counted. Although there is no data on cooking fuel in the Bokep statistics, as in Panapat it was clear during our visit that wood is the main source of fuel. This is clearly a major pressure on local resources, with few remaining sources of wood (forests/mangroves) seen nearby.

3.2.1.5 Bokep Village Scenes - Figure 13

Panapat viewed from the Mosque

Panapat Mosque and Water Tank

Kios in Panapat

Panapat Coastline

Family Life

Children playing with small explosives

Figure 13a - Panapat Scenes

Toropot Village

In Village Secretary's House

Toropot Market

With Toropot local guides

BCF Capture Demonstration

Lagoon & Seaweed Farming

Figure 13b - Toropot Scenes

3.3.3. Liang District (Liang Town)

According to secondary data (Lunn & Moreau 2001, Allen & McKenna 2001) and previous conversations with people from this area, there were high population levels of ***Pterapogon kauderni*** (Banggai Cardinalfish or BCF) in Liang District, but although one village (Tomboniki) had been active in the ornamental fish trade in the late 1990s, by 2001 trading had ceased.

Figure 14 - Liang District and Survey Location

Liang is one of 6 Districts on Pulau Peleng, by far the largest island in the Banggai Archipelago, and is in the area which was badly affected by the earthquake in 2000. As a result, the jetty in Liang town was destroyed. It is well known that the re-building, a Government project, was done through extensive mining of the surrounding and nearby coral reefs, in spite of laws strictly prohibiting coral mining. In addition to the direct environmental damage, this illegal activity by the Government has had the effect of making it almost impossible to enforce the legislation forbidding coral mining.

It was therefore felt that this was an area where it might be possible to gauge the effects of environmental degradation without fishing pressure. However it turned out that in fact Liang District is one of the areas visited by fishers from Bone Baru, and possibly elsewhere, and that over-fishing had had far worse effects than environmental disturbance on the local populations of BCF. For more details see Chapter 5 and Appendix 8.

Data was only collected in and near Liang town, the capital of Liang District, as shown in Figure 14. Biophysical data was collected in the harbour area, near the re-built jetty and around the two small islands at the entrance to Liang Bay.

Liang town has a mixed population of predominantly Banggai (mainly farmers, though some also fish) and Bajo (fisherfolk) ethnic groups. Seaweed farming is relatively recent and is making substantial contributions to poverty reduction among the fishing community. The local youth group is keen to become involved in conservation activities, and members facilitated the survey. There are pens for the live reef fish trade.

Liang is the site of a recently established Marine Secondary High School. The Headmaster of the Marine High School is very active, and this is an important potential resource for Bangkep as a whole, not just Liang village, as there is a boarding facility being built to facilitate attendance by young people from other villages and islands within the Regency. The School is forging links with the Marine and Fisheries Institute of Higher Education (STPL) in Palu to make it easier for pupils to continue to Diploma or Degree level after graduating.

Liang local Government has plans to develop the two islands in front of the harbour for tourism, by building accommodation there. Therefore the team was requested to evaluate the surrounding reefs from this viewpoint. Sadly, the coral mining had been so drastic as to leave few live corals. The seaweed farming now surrounds the islands, effectively protecting their reefs from further degradation by over or destructive fishing. The good water quality should promote recovery in the long-term and the area would be suitable as a coral reef restoration trial site. a potential tourism attraction as well as a practical conservation activity which would be within local capacity, e.g. the High School and/or youth group, with minimal outside support.

The Marine Secondary School

Bajo Houses

Seaweed farming

The Islands

Liang Bay

The Jetty built from mined coral

Figure 15 - Images of Liang

The de-populated BCF areas around the islands would also make an ideal trial site for in-situ breeding and population recovery trials for this species, another activity which the High School and youth group could undertake with support from the STPL in Palu.

Liang Town can be reached from Banggai Town by two daily ferries (one fibreglass speedboat and one wooden ferry, cost IDR 15,000) and overland by minibus (IDR 15,000) from Salaka Harbour, which has daily ferries (departing in the afternoon and arriving at night, IDR 35,000) to Luwuk. Images of Liang can be seen in Figure 15.

3.4. Stakeholder Profiles

The ornamental fish trade affects the lives of many people and involves many organisations, either directly or indirectly. These include fishers, traders, employees in related businesses, officers charged with enforcing regulations, Government Departments with specific responsibilities related to the trade, etc. There are also people and organisations not currently involved or only involved in a peripheral or otherwise limited way but who could or should be involved, or involved to a greater extent, such as Government Departments who could assist though they do not yet do so, local, national and international NGOs with capacity to assist, organisations or people who could provide capital for improvements, educational establishments who could provide training and other human capacity building, etc.

One goal of the case studies was to identify these "stakeholders", current and potential, in order to better understand the mechanisms at work in the ornamental fish trading system, identify which among them are poor and also which among them could contribute to alleviating poverty in some way and/or to improving sustainability of the trade. For sadly even before collection of primary data in the field it was abundantly clear from initial (secondary) data that in it's current form the trade is not sustainable, as it is contributing to serious degradation of the resources on which the trade depends, wild populations of marine ornamental fish (Lunn & Moreau 2001, Green 2001, Kolm & Berglund 2003, Roach 2003, Wabnitz et al 2003).

This section aims to identify the main stakeholders, and, where appropriate and/or available, additional data such as their role (in theory and in practice), their perceptions of the trade, positive and negative, their aspirations, and the contributions they could make to improving the situation. Due to the limitations of this study, the list and the data may not be complete, but do aim to be as accurate as possible and to provide a foundation for realistic recommendations. Some additional data and information from key informants is given in Appendix 11.

This study aimed first and foremost to identify and define the stakeholders based within or operating within the case study area, Bangkep Regency. Where possible more "remote" stakeholders were also identified and some data collected where possible. The stakeholders identified have been divided into four categories:

- Stakeholders directly involved in ornamental fish collection and trading activities
- Other local stakeholders with a major interest or role in the Ornamental Fish Trade (OFT)
- Trade associations and other relevant organisations
- Other sources of expertise and support for the OFT and/or improving Livelihoods

Each of these categories is considered separately below. Key Informants are listed in Appendix 9 (A9.a) and some can be seen in Appendix 2 (A2.3)

3.4.1. Major Stakeholders Directly Involved in the Trade Chain

These have been divided into three main categories: the local fishers who collect ornamental fish; buyers and fishers from outside the Regency who come to Banggai to purchase and/or catch fish; and larger buyers/exporters to whom the fish are traded after leaving the Banggai Regency.

It should be noted that there were local financiers/buyers in 2001 or have been in the interim period, but that by the time of the survey in 2004, there were no longer any in operation. The reasons for this are further discussed in Chapter 6, in the Livelihoods Analysis.

3.4.1.1. Local Marine Ornamental Fish Collectors

Local villagers have been involved in the OFT since the late 1980s (KI, FGD). The locations and numbers of these collectors in 2001 (Lunn & Moreau 2001) and in 2004 (survey data) together with data on collector organisation are shown in Table 9 below.

Table 9 - Ornamental Fishers in Bangkep Regency

Island	Village	Rating in 2001 in 2004	Year Trade Started	No. of Fishers 2001	No. of Fishers in 2004	Collector Organisation 2001	Collector Organisation 2004	Ethnic Origin of Collectors
Banggai	**Bonebaru**	*** ***	1999	20	21	Fisher Group	2 Fishermen [25]Co-ordinate	Banggai
	Banggai	?	?	0	0	Buyer/Holding	None	
	Tinakin	*** *	1999	30-60? 20 - 30	0	Fisher Group/Direct	Trader Base	Bajo
	Monsongan	*** **	1995	20	19 15 Families	Direct	Direct[26]	Bajo
	Tolokibit	*** **	1999*	20	20	Direct	Sekdes co-ordinates	Banggai/ Bajo
	Matanga	**	1999	20		Direct		
	Bandang	**	1998/ 1999	2		Direct		
Bokan Group	**Kokudan**	**	2000	20		Direct		
	Toropot	** ***	2000	20	50	Direct	2 fishermen co-ordinate	Bajo
	Panapat	*** ***	1997	5	±15	Fisher Group	Village Head co-ordinates	Banggai/ Bajo
	Buangbuang	**	2000	20		Direct		
Labobo	**Lalong**	*	2001	1		Local Buyer/ Holding		
	Bontosi	*	2001	10		Direct		
Bangkurung	**Bonebone**	**	1999/ 2000	8		Direct		
	Dunkean	**	1999/ 2000	10		Direct		
Peleng	**Tomboniki**	none	1998	10		Local Buyer/ Holding		
	Popidolon	*	2000	20		Local Buyer/ Holding		
	Bayalon	*	2000	4		Local Buyer/ Holding		

[25] There were an unspecified number of local financiers who no longer underwrite ornamental fishing.
[26] There have been at least two local buyers who acted as financiers, but both have ceased operations

From the data in Table 9, it can be seen that significant changes have occurred in some of the villages surveyed. In general, a high proportion of full-time fishers are or have been involved in the OFT, either as a main or as a secondary livelihood option.

Organisation and Numbers

Most villages now have a co-ordinator, who in two cases (Panapat and Tolokibit) is also a village official, though both were active in the OFT long before taking office, and although not openly stated it seems that this OFT co-ordinating role was one reason for their selection as Village Head (KD) and Village Secretary (Sekdes) respectively. In all cases the co-ordinators are also collectors and none of them buy fish from or store fish for other fishers.

The numbers of ornamental fish collectors (OFC) have remained relatively stable in most villages, but in Toropot have increased, as more people make this activity a part of their livelihood strategy. In Tinakin Laut there are now no OFC. Reasons for this are more fully given in Chapter 6 but basically relate to resource depletion making the activity uneconomic.

Profile of Local Ornamental Fishers

The two main ethnic groups involved as OFC are Banggai, where only the men take part, and Bajo, where often whole families are involved in OFC.

Depending on species collected, methods used and organisation of collecting, three types of local OFC can be identified:

- Independent BCF fishers, who do not use compressor or cyanide, and only catch the BCF and any other fish they happen to be able to obtain using simple equipment (Appendix 10) which they own: nets, an oar (or similar) for chasing fish, home-made goggles or patent diving masks, and a boat to access fishing grounds. This type of OFC was found in all active OFT villages surveyed except Panapat.
- Compressor fishers, who in addition to BCF collect other types of ornamental fish, such as angel fish, surgeon fish and others. Many of these fishers use potassium cyanide (locally called potas or sometimes bius) to facilitate capture. More details on this are given in Appendix 12. These fishers are at risk of various diving-related health hazards, as described in the paragraph on Health in Chapter 3.2. Some of these fishers own their equipment, some work for other fishers or local equipment owners, and some are in the process of acquiring their equipment in instalments, either fixed monthly payments or through arrangements related to the proceeds of fishing. No local compressor fishers met during the survey are full-time ornamental fish collectors, all collect food fish (often also with cyanide) or invertebrates such as lobster, sea cucumbers, pearls etc. Compressor fishers were found in Bone Baru and Toropot. There is anecdotal information that this type of OFC are operating also in other islands/villages which were not visited.
- Dependent Fishers, who do not own any equipment or go fishing on their own, but go along with buyer boats when these come, using gear supplied by the buyer boats. These fishers fish alongside the boat crew, and all get paid a fixed price per fish caught. This arrangement was only found at Panapat during the survey but may occur elsewhere in Bangkep.

3.4.1.2. Visiting Marine Ornamental Fish Collectors and Buyers

In addition to Bangkep residents, many ornamental fishers come from outside the Regency to catch fish and/or to buy fish caught by local fishers. Some people come only to buy fish without collecting themselves. The team were able to obtain quite detailed data on some of these groups, but very little on others. Data on traders visiting the Archipelago from 2001 (Lunn & Moreau 2001, BCF fishery only) and from the survey are given in Table 10 below.

The non-local OFC and buyers can be divided into 5 categories which are described below:

- Fisher/buyers who work with local fishers, going to the fishing grounds together - the Panapat scenario described above. These boats and their crews are from Bali. These fisher/buyers sometimes also buy fish from independent fishers.
- Fisher/buyers who may fish alone but buy some or most fish (especially BCF) from local independent OFCs. This pattern was found at Tolokibit with a boat operating out of Luwuk, Palu-based company.
- Buyers who do not fish but buy from local OFC - Tumbak boats visiting Bone Baru, Monsongan, Tolokibit, Toropot, and Kalupapi (Bankurung Island), possibly other villages also. These used to be OFC in 1999 (Moore 1999) but changed to buyer roles. More information is given in Appendix 11.

Table 10 - Traders in Bangkep

Island	Village	Origin of Outside Buyers		No. of Buyer Boats or other buyer data		Frequency of Buyer Visits[27]	
		2001	2004	2001	2004	2001	2004[28]
Banggai	**Bonebaru**	Tumbak	Tumbak	T:10	T:1 - 3 boats T: KM Sinabung	weekly	Irregular 2 weeks
	Tinakin	Tumbak Bali		T:4 B:1	0	weekly	
	Monsongan	Tumbak	Tumbak	3	T:1 - 3 T: KM Sinabung	weekly	Very Irregular 2 weeks[29]
	Tolokibit	Tumbak Bali	Tumbak Luwuk/Palu	T:1 B:1	T:1 L/P:1	weekly	Irregular Irregular
	Matanga	Tumbak		T:2		2 weeks	
	Bandang	Tumbak		T:4		weekly	
Bokan Group	**Kokudan**	Tumbak		T:1		2 weeks	
	Toropot	Tumbak	Tumbak Bali[30]	T:4	T:1 - 3 B:? T: via KM Sinabung?[31]	2 weeks	Irregular
	Panapat	Tumbak Bali	Bali	T:2 B:2	B:3	2 weeks	Usually 2 - 4 per month
	Buangbuang	Tumbak Bali		T:2 B:1		2 weeks	
Labobo	**Lalong**	BoneBaru to Tumbak		1		n/a	
	Bontosi	Tumbak Bali		5 (T:2, B:3)		weekly	
Bang-kurung	**Bonebone**	Tumbak		3		2 weeks	
	Dunkean	Tumbak		3		2 weeks	
Peleng	**Tomboniki**	To Tumbak own boat		Ceased trading by 2001		Unknown	
	Popidolon	Tumbak		1		once in 3-4 months	
	Bayalon	Tumbak*		n/a		once in 5-6 months	

[27] All boats are irregular now, depends on weather, market demand, how many fish they already have from other sources, and for some, profitability of other uses of the vessel.
[28] More detailed information per village in Chapter 5
[29] Buyer doesn't always come to Monsongan
[30] The Toropot fishers deny selling to Balinese boats but according to Panapat sources and to Toropot villagers met outside the village, Balinese boats do buy from Toropot but do not enter the village, sending "agents" in to buy for them as they know they are not welcome overtly.
[31] Not certain whether this route is used or not, based on information from Toropot resident met on ferry to Luwuk.

- Buyers who operate via public transport, using the passenger liner KM Sinabung, which has a regular fortnightly schedule from Jakarta to Bitung (near Manado) via Banggai and other destinations. These are Tumbak buyers who used to operate via wooden boats as above.

- Fishers who operate alone with no link to local OFC or villages or authorities. Some of these OFC used to work with local communities until they knew the fishing grounds well enough to work alone. All are viewed as thieves by Bangkep villagers, who feel powerless to do anything about the situation. According to FGD and KI participants, most are Balinese or Madurese (a Javanese ethnic group), and they reputedly have links in Kendari, Luwuk and Makassar. It was not possible to meet any of these fishers in Bangkep.

3.4.1.3. Major Buyers/Exporters outside Bangkep

Very little information was available regarding these buyers, other than their locations. Available information is given below.

- Buyers in Manado, some with agents in Bitung, buy from the Tumbak buyers and sell fish to other major buyers and/or exporters, most are flow to Denpasar in Bali.
- Buyer in Palu, has own boat operating out of Luwuk, and sends fish to Surabaya by air. No information on chain after Surabaya. Note there are other OFT buyers in Palu, some fish are sent to Makassar, Jakarta and Denpasar, however most of these it seems are not from Bangkep.
- Buyers in Bali, some have own boats operating in Bangkep, such as the boats working with Panapat villagers and those termed "thieves" by locals. Some are intermediary buyers, some are exporters, some both export themselves and sell to other buyers/exporters.
- Buyers in Java, especially Jakarta: from secondary sources (internet and literature) and from key informants, it is clear that these buyers do deal in fish from Central Sulawesi, including fish from Bangkep, though the trade route was not clear from survey results.
- Possible Buyers or Intermediaries in Kendari/SE Sulawesi and Makassar: although no detailed information available, many Bangkep fishermen believe there is trade via the Kendari route. The Palu buyer used to send fish from Tolokibit (possibly also other sources) via Kendari. Several sources also stated that fish do go through Makassar. However it is not clear whether fish from Bangkep actually change hands at these two locations, involving additional buyers, or merely transit, only involving extra transport service providers.

3.4.2. Other Major Stakeholders

Other major stakeholders have been divided into three groups, local community members or institutions, mainly at village level, Government institutions and officials, and service providers.

3.4.2.1. Local Community

Within the local community certain people have an especial interest in or have the potential to affect the OFT. These include:

- The Village Head (KD), Village Secretary (Sekdes) and Badan Perwakilan Desa (BPD). The BPD is the lowest level of elected legislative assembly. It is supposed to work with the KD and Sekdes. Together, these village leaders are supposed to ensure Government programmes are implemented effectively and efficiently, and to represent the village people at higher levels.

Current involvement in OFT includes in many cases levying a payment from visiting OFT vessels wishing to operate in village waters (e.g. Panapat IDR500,000 per vessel per visit; Toropot IDR50 per fish), and sometimes refusing permission to certain OFT vessels (e.g. Toropot banning Bali boats which visit Panapat, Panapat banning Tumbak vessels). So far this is

usually without firm legal grounds. In some cases village leaders are also directly involved in collecting and in organising the trade, though in all such case encountered these roles preceded their taking up official positions.

Under OD (Otonomi Daerah, Regional Autonomy), the BPD has the power to pass local laws and regulations, called Peraturan Desa or PERDES, which can then be enforced at village level, without going through the cumbersome (and often ineffective) justice/court system. Before becoming effective, these PERDES have to be agreed also by the District (Kecamatan) and Regency (Kabupaten) Government levels. There are two main restrictions to the PERDES: they cannot conflict with higher level (Regency, Provincial or National) legislation; and the penalties (especially fines) which can be imposed for infractions are limited.

However potential involvement could extend to regulation of all aspects of OFT at local level, from capture to sales. Regulations on equipment and fishing methods, fishing seasons, locations (e.g. rotations, no-take zones), prices, holding facilities, user fees/licences etc are all possibilities.

These village leaders, in their official capacities, also have the right and the duty to communicate with higher levels on behalf of their villagers. Therefore they can be advocates for the support needs of OFC and the OFT in order to improve contribution to local incomes, both for OFC as individuals and for the community as a whole (e.g. via licensing fees, taxes etc). Conversely, if the higher levels see the need for programmes to support the OFC and OFT, these leaders will be key implementers at the village level.

- Other fishers and marine resource users, using other gears and catching other species

These fishers (often family members of OFC or sometimes even OFC themselves) are also dependent on the marine resources of the waters fished by the OFC. If they use destructive methods, their activities can negatively impact the OFC resource base. Conversely, if the OFC use destructive methods, they can reduce the resource base for other fisheries/fishers.

Destructive methods used by OFC include the use of cyanide and deliberate or careless use of equipment leading to mechanical damage to coral colonies and other substrate. Destructive activities by other fishers include bomb (reef fish, sometimes schools of small pelagic fish, mainly for sale as dried salt fish or ***ikan asin***, but also as fresh fish) and cyanide fishing (reef fish for the LRFT[32] or local consumption as fresh fish and lobsters). The devastating effects and high economic as well as environmental losses from these two activities are well documented and widely known (Pet & Pet-Soede 1999, Pet-Soede et al 2000, Mous et al 2000). Other fisheries and resource use activities which were seen to directly cause considerable damage include: coral mining, collection of invertebrates (skin diving, compressor diving or gleaning at low tide) where coral colonies are broken apart or overturned such as abalone, tridacna clams, octopus and some kinds of sea-cucumber; collection of invertebrates where the substrate is unintentionally damaged by trampling or similar, such as most sea-cucumber collection, spear-fishing, collection of tripneustes sea urchins and various edible molluscs, etc. In addition, anchor damage was clearly visible at several survey sites. Crown of thorns or COTs ***Acanthaster plancii*** were seen in above average numbers, indicating imbalance in the ecosystem possibly caused by the over-harvesting of Napoleon Wrasse, ***Cheilinus undulatus***, which is harvested at levels which are obviously not sustainable in view of known biological/lifecycle factors regarding this long-lived and slow-growing species, where only the largest/oldest fish become males. Some ornamental fish including BCF are found in seagrass beds, which are also the feeding grounds for sea turtles and dugong. Research presented at the ISTS[33] in 2004 has shown that sea turtle and dugong grazing is important to maintaining healthy seagrass ecosystems However, these species are fished to the point where populations are, according to local fishermen and other sources, much

[32] Live Reef Foodfish Trade
[33] International Sea Turtle Symposium, an annual event, held in Costa Rica in February 2004

reduced, threatening the ecological balance of this important ecosystem as well as the potential local extinction of the species concerned.

Many of the activities above are illegal: coral mining (by Government projects as well as villagers); collection of protected species such as tridacna clams (in vast quantities), sea turtles (hundreds if not thousands) and dugong (few but significant compared to the population), catching/trading of Napoleon Wrasse under 1kg and over 3kg weight (hundreds of illegal-sized fish seen in holding pens); use of cyanide and explosives in fishing.

From this it can be seen that the livelihood activities of other fishers and villagers using marine resources (such as women and children gleaning, people mining coral) can have significant impact on or be significantly impacted by OFC activities.

In addition, if regulations affecting the OFT are instituted, which could well include restrictions on or regulation of marine resource use for everyone, not just OFC, then these villagers will have a major "stake" and need to be fully involved in the design and implementation of such measures.

3.4.2.2 Local Government Departments and Agencies

Local Government Departments and Agencies below are the main agencies directly concerned with OFT and are divided into Regency level and higher levels. Other agencies whose activities are related to livelihoods and/or could assist in improving poor people's livelihoods are described in 4.1.4.2.

Regency level:

- **The Regency Office (Kantor Bupati Banggai Kepulauan):**

The Regency Office is largely concerned with overall policy, and as such has a major role to play. The two major officials are the Bupati (Regent), the highest elected official, who is assisted by a deputy (Wakil Bupati) and the Secretaris Kabupaten (Regency Secretary, often referred to as Sekab), the highest career civil servant. Support from these key stakeholders is vital. The current Bupati H. Ali Hamid SH and Sekab Drs Zakariah Kamindang (Appendix 11, Figure 16) are generally in favour of moves to improve the livelihoods of local people and particularly support moves to improve the ornamental fish trade.

The stakeholder meeting (Appendix 13 and Appendix 14) held after the field data collection and analysis was supported by the Regency Government, though organisation was delegated to the Marine and Fisheries Department. The case study team have been asked to submit a proposal for implementing some of the recommendations agreed at the stakeholder meeting in 2005.

Figure 16 - H. Hamid, Bupati and Drs Kamindag Sekab (with Samliok Ndobe)

- **The Marine and Fisheries Department (DKP - Dinas Kelautan dan Perikanan Kabupaten Banggai Kepulauan**

The marine and Fisheries Department is the Government agency with the most direct interest in the OFT, at the collecting level. Responsibilities include socialisation of fisheries regulations, technology and other capacity building activities; surveillance and some aspects of enforcement of marine and fisheries related legislation; issuing of fishing/fishing vessel permits and licences; maintaining data on fishers and marine/fisheries resources, including catch and other data; advice on marine and fisheries related matters to the Regency Legislative and Executive bodies; drawing up Marine and Fisheries programmes for the Regency (which are approved, rejected or modified by BAPPEDA and the DPRD), and liaison with higher level Marine and Fisheries Departments (Provincial and National). More detail, especially on surveillance, data collection/management and outreach activities is given in Appendix 11, and some key personnel are shown in Appendix 2 (A2.3).

A hatchery facility is being built near Bone Baru, one of the surveyed OFT villages, intended for grouper seed production. However the facilities available and the expertise of personnel, have the potential to assist in the culture of other species and/or other fisheries-related activities.

Human and other (especially operational) resources are very limited, but the staff (Figure 17) are in the main young, keen fisheries graduates, and work beyond their official duties, in terms of time and of activities undertaken. For example, most assist as teachers at the Fisheries High School in Banggai in their "free" time.

Figure 17 - DKP Staff including Drs Kornelis (Far right) (with Abigail Moore & Samliok Ndobe)

The Program Head Drs Kornelis Yabie is especially keen to promote conservation as he sees current practices as being largely unsustainable. The Department staff admitted they have no real data on most aspects of marine resources and fisheries, especially stocks and catch levels. There is only one surveillance/enforcement officer, a programme to involve local communities is seen as the way forward, and early steps have been taken. However without PERDES, the village surveillance groups have very limited powers.

- **The Department of Trade and Industry (Koperindag - Dinas Koperasi, Perindustrian dan Perdagangan Kabupaten Banggai Kepulauan)**

The Koperindag is responsible for trading licenses and fees, and also for all business licensing/registration, from single traders (e.g. ***kios***) up to larger companies (CV/PT), for all commodities and types of business, unless specifically covered under another department (e.g. vessel registration). Very few businesses actually take out permits unless required for a bank loan, as a license to operate is a basic condition of all business loans.

Data collection (***pendataan)*** is undertaken every year, and "***sosialisasi***" is undertaken at the same time. The main focus so far has been land-based businesses, especially those where consumer health is considered at risk, e.g. informing kios owners of products no longer licensed or legal to sell (such as some food colourings), checking sell-by dates etc. Expired or retired goods are confiscated and destroyed. Because of lack of personnel and funds, only a few areas/businesses are visited. Businesses not complying are made aware of the proper procedures and requested to comply. Some consumer awareness is also undertaken at public gatherings, business meetings, training events etc. There is no checking as to whether fish sold is "***layak di jual***" - fit for sale - yet, although according to staff there should be (e.g. bombed fish).

For trading outside the area, whether in-country or for export abroad, all commodities require a certificate and have to pay a fee to Deperindag. However none has so far been issued for ornamental fish. For the past two years at least there has never been any sanction or action taken against people or companies without licenses or who don't report (6 monthly) as per the rules, for any commodity.

So far, no business licences = SIUP (Surat Ijin Usaha Perdagangan = trading licence) or TDP (Tanda Daftar Perusahan = business registration) have been granted for "***ikan hias***" - ornamental fish related businesses. The Department would welcome moves to make the OFT more organised, with meaningful contributions to local Government income. More detail is given in Appendix 11.

- **The Regency Parliament (Dewan Perwakilan Rakyat or DPRD)**

This elected body is the legislative assembly for the Regency. Potential roles related to the OFT include: the power to propose and pass or refuse to pass Regency level legislation (PERDA); the power to approve, reject or modify proposals made by government departments; the power to approve or reject PERDES proposed by Village level legislative bodies (BPD); the power to influence Regency policy.

It can be seen that support of the DPRD is essential. The DPRD representative at the Stakeholder meeting was very supportive and made several pertinent observations and suggestions

Higher Level

- **Provincial Marine and Fisheries Department in Palu (DKP - Dinas Kelautan dan Perikanan Propinsi Sulawesi Tengah)**

Under OD - Regional Autonomy - the Provincial level government departments have essentially a co-ordinating role, especially for border areas between Regencies. However for Marine and Fisheries the role goes beyond this, because of the way the sea is divided up - 0-4 miles from land is under Regency control, 4-12 miles from land under Provincial control, and 12 miles offshore to the extent of the Indonesian EEZ (Exclusive Economic Zone) is under National control. Because most OFC takes place in coastal waters, the Provincial level is unlikely to make direct interventions in fishery or trade activities, but can and indeed should play a supporting role, for example in capacity building, funding specific interventions, etc, and the current Head is keen for this to happen.

The Provincial Marine and Fisheries Department facilitated a meeting in Palu to review the case study initial results (Appendix 13 and Appendix 14). At this meeting valuable information and suggestions were made. As a result, the base study team have been requested to submit a proposal for practical action related to the OFT in Bangkep as soon as possible, which if accepted will be implemented in late 2005.

- **Fish Quarantine in Luwuk (Kantor Stasiun Karantina Ikan Luwuk-Banggai)**

The Luwuk fish quarantine station (Karantina)was opened in 2003 (Figure 18), and covers 5 Regencies, Luwuk Banggai, Banggai Kepulauan (Bangkep), Tojo Unauna, Poso and Morowali. The branch was formed in 2003, before that karantina services for this area were administered from Makassar. There is also a station in Palu, with whom they work closely. Last year there were only 3 staff, now 9 PNS (civil servants) and 4 "honor" (almost voluntary workers, hoping to become PNS). One person is based in Pagimana at the only branch office opened so far, which is also in Luwuk-Banggai Regency. There are no branch offices in Bangkep, or the other three Regencies.

The staff say that most businesses or individuals don't know about the Karantina. If they do know, they only "see" the costs, don't see any benefit, so most try to avoid it. They also said that many people do want to follow the rules, if they understand why they are important. The

Karantina staff themselves want to follow the rules, but don't want conflict, and say they use a "softly-softly" approach. There is a brochure available and the staff are willing to go to the field if their services are required, but they need to be paid, as they have restricted operational budget.

The staff feel it is difficult to know how to meet "stakeholders" as dispersed - many small operators, not just a few easily targeted companies, and no effective umbrella body like a local Chamber of Commerce (including small businesses, self-employed etc) or sectoral organisation such as an association of people with fisheries related businesses. Only 2 or 3 companies so far from Bangkep have ever used the Karantina services

Karantina tasks include checking:
- Fish health
- Species/type of fish
- Water quality (used in transport/holding)

The reception area


Laboratory entrance


An ornamental specimen

Figure18 - The Karantina Facilities in Luwuk

Administration and taking/testing samples are the main jobs of the staff. Live product is returned alive to the owner, so testing is non-destructive, and extra checks can be made on demand (e.g. to comply with importing country regulations). Testing is done on a sample basis (1-5 specimens, more is better, depends on quantity of freight and species), either the staff go to the operator, or the fish are brought to the laboratory, which is quite well equipped (see photos). Karantina duties do not include checking for cyanide (at least explicitly). In the rules, there are 8 stages and if there are irregularities, the highest sanction is refusal to grant a certificate. No prosecution or other sanctions available at this level.

ALL fish or marine products leaving the area, whether in-country or for export should have a certificate from the Karantina. Certificates issued in Luwuk are good for all levels including for export, no further check required further up the chain, e.g. in Palu, Makassar, Surabaya, Bali etc, just need to show this certificate to the Karantina there. The only OFT business which has reported to them is based in Luwuk and Palu, certificates to Surabaya are requested. The route is overland to Palu, they don't know what transport is used from Palu onward. The Karantina do not know about the MV Sinabung route for OFT.

The Karantina staff expressed a desire to work with other stakeholders to improve the system of marine product marketing, like the idea of certification, especially if they are involved. More detail is given in Appendix 11.

- **BKDSA Propinsi Sulawesi Tengah in Palu (Balai Konservasi Sumber Daya Alam)**

The BKSDA is the conservation branch of the Forestry Department, and is responsible for all protected areas and protected species, terrestrial and marine. This is a source of some tension as the Marine and Fisheries Department also has a conservation arm which has an increasing role in marine conservation, and it seems the boundaries of responsibility are often unclear. However in

the case of the transport and trade of endangered species which are protected by law, the responsibility of the BKSDA is clear.

The Palu-based Provincial BKDSA covers the whole of Central Sulawesi. As Bangkep has no official marine protected area (MPA) to date other than mangrove forests which automatically now qualify as protected areas, BKSDA has no staff permanently in Bangkep. The only known current involvement in OFT occurs in Palu, when the fish are in transit by air. At the Palu airport, the BKSDA work closely with the Karantina in monitoring shipments of live fish, in order to prevent the trade of protected species. How effective the checks are is not known, but apparently as for Karantina, checks are made on samples, not the whole consignment. So far no infractions have been reported. However, should there be any National MPA established in Bangkep, BKSDA involvement would be greatly increased.

3.4.2.3 Service providers (Transport & Other)

- Sea Transporters: The main means of transport for the OFT from Bangkep other than buyer/collector owned/operated boats is by PELNI, the Government owned passenger liner shipping company. KM Sinabung is one of the PELNI ships, and carries some cargo as well as passengers, including a number of containers which are used both to bring in bulky commodities and take out local produce, such as cocoa, kopra etc. KM Sinabung calls at Banggai harbour every other Thursday night on her way to Bitung, near Manado, arriving the following morning. Every other Friday lunchtime she calls at Banggai on her way to Jakarta, a journey of around 2 days.

The PELNI staff are not (at least officially) aware of the use of their ship as a means of transport for aquarium trade produce. The fish are loaded as ordinary luggage, without extra payment, or any form of reporting. The buyers staff accompanying the consignment no doubt pay for their tickets. The potentially explosive oxygen tanks used for packing the fish are carried concealed (on the occasion witnessed, wrapped in sacking), thereby posing a hazard of which the crew and other passengers are unaware. Therefore the PELNI company does not reap any substantial benefits from this role, and unknowingly carrying dangerous items, a risk to people and property.

- Air Transporters: The field survey concluded that the small aircraft (propeller-powered) air service by Merpati out of Luwuk (see Appendix 2, A2.5) is not used for the transportation of ornamental fish. However the various plane services out of Palu do seem to be used. The carriers are Merpati, Bouraq and Lion Air.

The main source for this data is BKSDA staff working at the airport for several years. Staff at the airport cargo office and at airline offices denied any transport of live fish (ornamental or other) by air from Palu, surprising as this is not an illegal trade except for protected species. Live fish are regularly carried on planes leaving Palu, for Surabaya, Jakarta, Denpasar, Makassar and Balikpapan. The trade has been going at least 10 years, apparently started soon after Palu airport opened, and has increased over time.

Types of fish carried regularly include "nener" (milk fish fry), the major commodity transported in this way, mainly to Balikpapan and Makassar, and ornamental fish, mainly to Java and Bali but sometimes also Makassar. No mention was made of live reef food fish, and as this can be sensitive subject (especially relating to Napoleon Wrasse, protected by law but known to be illegally traded), the point was not pressed.

The airline is responsible for their safe arrival - any dead fish will result in refund or compensation. The fish are apparently handled with great care, quite unlike the way passenger luggage is treated. There are rarely any casualties.

The customer sending the fish has to phone in advance to ensure there is space on the plane, because the fish are not placed with the general luggage/cargo but in a special reserved part of

the hold, of limited dimensions and sometimes used for other items. In general around 10 containers are sent on one plane, though there are often larger consignments, frequently 30 containers, which tend to be divided into 2 or 3 flights, on the same and/or subsequent days.

- Road transporters: little is known except that ornamental fish are transported by road between Luwuk and Palu (over 12 hours), and between Tumbak or Bitung and Manado (under 4 hours).
- Oxygen providers: one item essential to the OFT is oxygen, used in packing ornamental fish for transport over all but the shortest of distances. At present, this commodity is not available in Bangkep, and is brought by the various buyers/collectors from outside the area, e.g. from Manado, Luwuk/Palu, Bali etc. These tanks are sometimes owned (e.g. Tumbak boat has tanks donated by IMA, International Marinelife Alliance pre-1999), and sometimes work on a deposit/refill system similar to calor gas. The Bangkep Health Department has a programme for special treatments called MATRA. Under this programme, they hope to have an oxygen machine in 2005, at latest 2006 at the new Hospital at Adean. Oxygen is used in for medical purposes in quite large quantities, in the outer islands as well as in Banggai and Peleng. It is brought in from Luwuk on the public boats. The cylinders cost over 2 million each and each re-fill costs around IDR 200,000Rp by the time it reaches the health units in Banggai, even more in, say, Bokan. The oxygen production unit will cost around 1.2 Milliard - 1,200 million Rp. The DK Head hopes to sell oxygen for non-health uses also, e.g. welding and tourist diving operations, and now he is aware of the possibility, is now is very keen to supply to the OFT also (Health Department Head personal communication).
- Finance providers and sellers of supplies and equipment: like most fishermen, OFC are rarely out of debt. Reasons for this are discussed in Chapter 6. In many cases this is to buyers. Previously there were local intermediary buyers who took on this role, but in 2004 all met had ceased involvement in the OFT. Currently, apart from buyers, the main finance providers are local store (***kios***) owners who provide most of the supplies and equipment needed, pawn brokers and ***rentenir*** or professional loan sharks.

4.1.3 Trade Relevant Associations & Other Institutions

There are several potentially relevant trade associations at National level, which have websites (see references), but do not yet have branches in Central Sulawesi and there are no branches so far in Bangkep. These include:

- Indonesian Fisheries Federation
- Indonesian Ornamental Fish Exporters Association
- Indonesian Aquaculture Society
- Indonesian Coral, Shell and Ornamental Fish Association

One such association does have a Central Sulawesi Branch, based in Palu:

- **APIHI (Asosiasi Pengusaha Ikan Hias Indonesia):** The Palu Branch of this ornamental fish traders association was represented at the stakeholder presentation in Palu (Appendix 13). There are several Palu-based marine ornamental fish traders. The association would welcome a general improvement in regulation of the trade, especially moves which would make procedures clearer and easier to comply with, and which would support sustainability of the trade. There is a feeling that the current regulations are onerous and confusing, so that they admit to often finding ways around them or not knowing whether they are truly complying or not. There was a (not yet confirmed) report of released Banggai Cardinalfish establishing a colony in or near Palu Bay which is now also being used as a source of ornamental fish for trading. According to APIHI spokesman, in Central Sulawesi, ornamental fish are caught in Palu Bay, the West coast, Tomini Bay and the Gulf of Tolo/Banggai Islands. Most fish transiting Palu arrive in Palu by road and leave Palu by plane.

3.4.4 Sources of Expertise and Potential Support

Potential sources of expertise and support other than those already mentioned above are many and varied but only a few key institutions are listed here, including local, national and international institutions.

3.4.4.1 The Marine Aquarium Council (MAC) and MAMTI Initiative

- **MAC**: The Marine Aquarium Council (MAC) has been active in promoting sustainability within the marine ornamental trade since 1988. MAC members represent trade and conservation interests and come from a variety of relevant backgrounds. One major achievement of MAC has been the establishment of a Certification scheme for the marine aquarium trade. The standards, originally in English, are available in Indonesian and MAC, in partnership with other organisations, has already started the process of certification with a number of Indonesian companies and other groups. Much information is available on the MAC website (http://www.aquariumcouncil.org). Gayatry Lilley of MAC Indonesia was one of the participants in the preparatory workshop for this study and has assisted with data and materials since. MAC can only work at local levels once a "scoping" process has been completed, which provides MAC with baseline data on which to make key decisions, and after key local stakeholders have requested MAC assistance formally in writing.
- **MAMTI:** The Marine Aquarium Market Transformation Initiative (MAMTI) is a major project focused on coral reef fisheries and trade reform in Indonesia and the Philippines. MAMTI is co-ordinated by CCIF (Conservation and Community Investment Forum), involving MAC, the International Reef Check Foundation and other partners. The objective of the project is to replace destructive collection practices for marine aquarium fish and corals in these countries with an ecologically and economically sustainable approach. The project is focused almost entirely on the village level, and will build the capacity of a significant number of aquarium fish collector groups and their communities to conform to the Marine Aquarium Council (MAC) Certification Standards. Fishers will be trained in best practices for aquarium fish collection and husbandry, coral reef management and basic business principles. The project will work with stakeholders to establish management plans for the collection areas, based on scientific assessment and monitoring for the reefs and stocks. The project is funded by grants from the Global Environmental Facility, as well as a number of Foundations and unilateral aid organisations.

3.4.4.2 Government Agencies involved in Welfare

- **Health department:** As mentioned under service providers above, the Health department has plans for an oxygen production unit. Under the same MATRA programme as the oxygen, the DK hey also have plans for a pressure chamber (very interesting for diving fishermen as well as tourism. Pressure chamber operating staff have already been trained although when a chamber will be available is not yet sure as no source of funding has yet been identified. In addition, the pro-poor health care planning and general improvements in health care infrastructure and services underway (see Chapter 6, Health section) should substantially benefit many OFC families as long as they are informed in time and register for the benefits.
- **BKKBN (Family Planning Unit):** The field staff of the BKKBN are a valuable resource, who could be involved in many other programmes as they are on the spot and have detailed local knowledge. The detailed data on poor families at the household level could greatly assist in planning of many types of activity related to livelihoods, especially for identifying potential participants on an objective basis related to their livelihood status and needs rather than based on their being "well-connected" or just lucky in getting to know about programmes as tends to happen at present. For more detail see Appendix 11 and Chapter 6, Health section.

- **Education department:** In addition to supporting the specialist Marine and Fisheries High Schools described in 4.1.4.3, the Education Department could play a key role, especially through development of the ***muatan lokal.*** This is an integral part of the new National school curriculum and means local content. The idea is that children learn about their own area, and there is no National material for this subject. As yet there is no specific material produced for Central Sulawesi as a whole or specifically for Bangkep Regency. This is both a gap and a big window of opportunity. In this island Regency, getting to know, understand and care about the marine environment, including practical ways to care for this important life-sustaining resource, should be an essential part of education from the lowest level to the highest. Although the Department does not have the human or other resources for undertaking development of such material at present, they are keen to work with people or organisations to develop and use such materials throughout the Regency should the opportunity arise.

3.4.4.3 Educational Institutions (Regency and Provincial)

Fisheries High Schools in Banggai Kepulauan Regency

- **Banggai :** There are two Fisheries High Schools (SUPM Mitra Bahari and SUPM Karya Sama Membangun) in Banggai, both private, run by local NGOs. Founded three years ago, the first class is about to graduate in mid-2005. More details in Appendix 11.
- **Liang:** The Marine High School (SMK Kelautan) in Liang started as a private school, but has now become a National supported state school. The headmaster (Figure 19) is very pro-active.

Figure 19- Pak Kasman (Right) Headmaster of Liang SMK Kelautan (with Samliok Ndobe)

Tertiary Education Institutes in Palu, Provincial Capital

- **STPL:** The Sekolah Tinggi Perikanan dan Kelautan (Institute of Higher Education for Fisheries and Marine) is headed by Samliok Ndobe, and is dedicated to Fisheries and Marine studies. Having an insufficient number of study subjects, the STPL does not qualify for University status but degrees and other qualifications issued will have the same status as those issued by a University. The STPL was founded in 2004, and there are over 50 first year students. The STPL is pro-actively recruiting students in areas where fishing and marine resources are a major livelihood resource, such as Bangkep. In order to do this, one strategy is building links with relevant High Schools such as those in Bangkep and this process has already begun.
- **Fakultas Perikanan UNISA:** The Fisheries Faculty at Universitas Alkhairaat (UNISA) in Palu has been established for over 10 years and has an annual intake of 30 to 60 students. The main emphasis has been on socio-economic aspects and fresh-water or brackish-water aquaculture, however efforts have been made to ensure as wide a variety of knowledge and especially hands-on experience as possible with very limited facilities and funds. Many DKP staff are now alumni of this institute, headed by Samliok Ndobe (as ***Dekan*** - Faculty Head) from 1995 to 2004 (Pak Samliok is still a lecturer at this University though no longer Dekan since becoming Head of STPL).
- **UNTAD:** Universitas Tadulako (UNTAD) is the State University in Palu. Although there is no marine fisheries degree programme at UNTAD yet, there is an aquaculture (fresh and

brackish water) study programme in the Livestock section of the Faculty of Agriculture (Program Studi Budidaya Perairan, Jurusan Peternakan, Fakultas Pertanian). Some of the staff have qualification and experience in marine fisheries and related fields, including Samliok Ndobe, permanent lecturer at this intitution.

3.4.4.4 Financial Institutions and Structures

- **BPD:** The Bank Pembangunan Daerah Sulawesi Tengah (BPD) is a Government owned Development Bank, with a Branch office in Banggai, headed by Pak Hasan Laminula SH. MM. This is a Bank whose function is to build the capacity of Central Sulawesi. The Village head of Panapat, Pak A. Rahman L. Katjiak, is one of the borrowers from this Bank, for his OFT business. So Pak Hasan knows quite a bit about the OFT, and knows it can be highly profitable. According to Pak Hasan, before the fatal illness of his daughter Pak Rahman was doing really well, and Pak Hasan anticipates he will do so again once he gets back into a more "normal" situation. Apparently the loan was, among other things, for holding pens and operational capital. Pak Hasan is very keen for BPD to get involved in the OFT, either with individuals, groups or organisations. He has a programme for capacity building in small business management, which he says is in "***Bahasa Pasar***" (which means simple everyday language) and is suitable for people of any educational level as long as they are literate and numerate.
- **Potential Self-Help:** There are a number of self-help structures which could be adapted for use in the Bangkep OFT situation, including the STREAM system (Anonymous 2004b) and the Grameen Bank system (http://www.grameen-info.org).
- **Other:** There are as yet very limited commercial banking facilities in Bangkep (none were seen) though several major Banks have branches in Luwuk which some Bangkep residents use. Government schemes for co-operatives, rotating loans (***Dana bergulir***) where the initial recipients repay not to the Government but to the next recipients, etc. To date none have proved successful in most areas of Sulawesi, including Bangkep, however if better managed have significant potential. Possibly because of the extensive direct contact with poor people, the BKKBN Head and staff had very practical ideas how these systems could be improved.

3.5. Marine Ornamentals Chain of Custody

One specific goal of the EC-PREP component “International Seafood Trade: Supporting Sustainable Livelihoods Among Poor Aquatic Resource Users in Asia (EP/R03/014)” is to provide a description of the chain of custody or market chain from "reef to retail" in as much detail as possible. The Sulawesi - Bangkep case study was mainly designed to identify the lower level market chain routes and mechanisms, while the Bali/Java case study was to focus more on the higher trading levels, once fish arrive from regional collectors and small buyers to large-scale buying/holding facilities and exporters. These data and those from the other country teams would then be matched with importer to retail data from Europe to provide a complete picture.

The Sulawesi case study team had the advantage of data and information from previous research in the area, especially that conducted by Lunn & Moreau (2001), before undertaking field work. Although limited to trade in one species (*Pterapogon kauderni*, the Banggai Cardinalfish), the data were quite detailed and much was found to be still applicable, though some significant changes had occurred by 2004. Further secondary data was obtained, some after the field visit, and where applicable is included (and referenced) together with primary field data in order to give as complete a picture as possible.

3.5.1. Collection

This section is largely divided by village, and covers 4 villages in Banggai District and two in Bokan Kepulauan (Bokep) District.

3.5.1.1 Who collects and Where

The villages with active ornamental fish collectors (OFC) and trading in BCF in 2001 (Lunn & Moreau 2001) and the main fishing grounds identified during this survey are shown in Figure 20, followed by more detailed information per village.

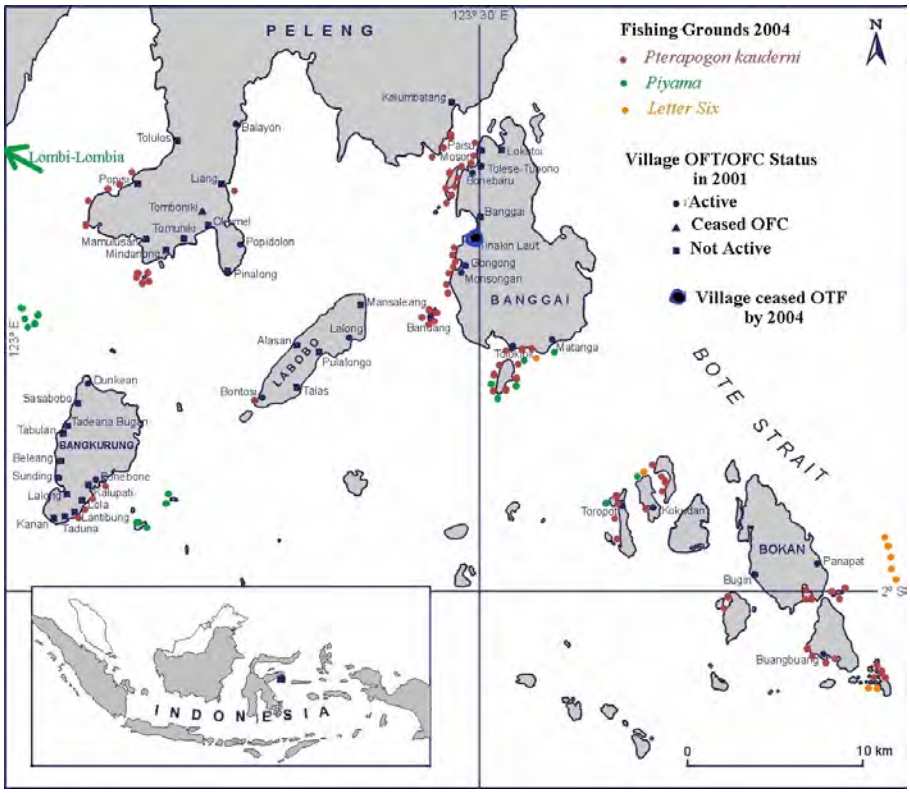


Figure 20 - Ornamental Fishing Activity 2001 - 2004

Bone Baru

Much information was gained from interviews with a number of Key Informants and a Focus Group Discussion (FGD) with a number of fishermen, mostly ornamental fish collectors (OFC). Additional information was gathered through informal conversations with both OF fishers, sometimes during the course of ornamental fishing (OF) related activities, and other village residents, through demonstrations by local OFC of collecting methods, and through general observation. There were few noticeable discrepancies between fishermen's replies and information from the key informants or from other sources.

According to the Tumbak traders, the DKP and other informants, Bone Baru is now the main centre of OFT via Tumbak/Bitung, whereas this role used to be played by Tinakin Laut and Monsongan.

The FGD resulted in a list of 21 fishermen in the village (Appendix 9) who are regularly or occasionally involved in OF collection, mostly though not exclusively for BCF. A total of 25 households are recorded as having fishing as the main occupation, which would suggest that most fishing households are or have at some time been involved in OFC. As in other villages, exact numbers vary, depending on other commitments, opportunities an "mood" etc. Two of these function as local co-ordinators, when dealing with buyers, but do not seem to regulate capture or other aspects of OFC activities, so cannot be said to form a fishermen's group.

All the OFC are Muslim and live in the main village. Only the men and boys are involved in OF, though women are sometimes involved in land-based post-harvest activities, as for other types of fishing in Bone Baru, as can be seen in the packing photographs (Appendix 15). Since 2002 the demand for ornamental fish has declined, and teenagers/young adults are in the main not interested in OF, it is the married men and sometimes their young children who are most involved. Collection sites for Bone Baru OFC are shown in Figure 21.

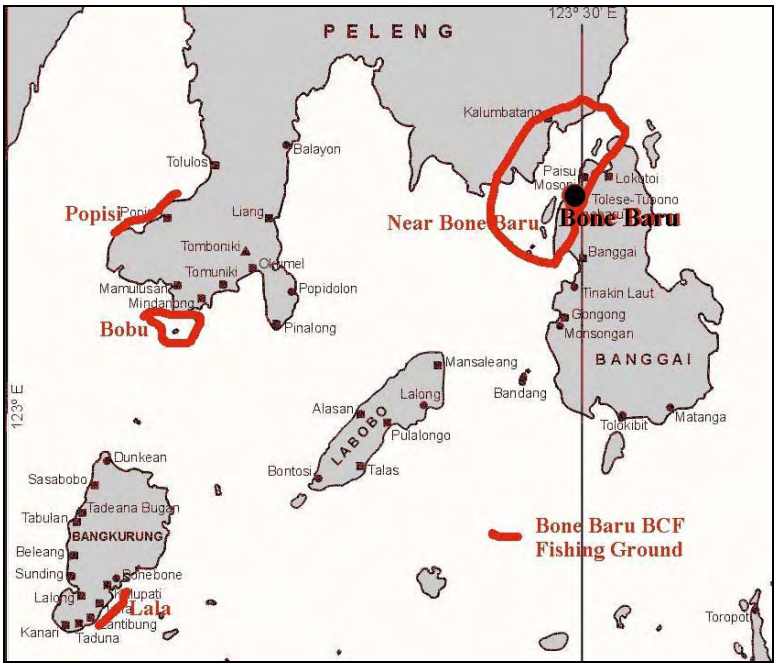


Figure 21 - Bone Baru OFC Fishing Grounds in 2004

Capungan or BCF, has been caught for the ornamental fish trade by Bone Baru fishermen since 1993. The four main fishing grounds were given as: around Bone Baru itself, near Popisi, Lala, and around Pulau Bobu. These areas are indicated in Figure B1, though the precise boundaries are not known. Pulau Bobu was one of the sites (No 43) where BCF was recorded during the 1998 Marine RAP survey (Allen & McKenna 2001), and Popisi is near another such site (No 44).

According to the FGD, the Bone Baru fishermen have an agreement with other nearby villages that they are the only village catching BCF in the area, while fishermen from the other villages are given concessions on other species/gears in Bone Baru waters. However according to Liang villagers, Bone Baru fishermen have taken BCF from their village waters, well outside the agreement area, but on the way to Bobu and Popisi, and are reputedly responsible for the almost total extinction of the BCF population around the two small islands in front of Liang Harbour (Appendix 8).

Monsongan

Much information was gained from interviews with a number of Key Informants and a Focus Group Discussion (FGD) with a number of fishermen, mostly involved in OFC (Appendix 9). Additional information was gathered through informal conversations with both OFC, sometimes during the course of OFC related activities, and other village residents, through demonstrations by local OFC of collecting methods, and through general observation. There were some noticeable discrepancies between fishermen's replies and information from certain key informants or other sources. Monsongan village consists of several sub-villages or Dusun, one of which (Dusun III) is almost entirely inhabited by Bajo fisher families, and is the only Dusun with OF collecting fishers.

Locally called ***Bebese Tayung***, the BCF has been caught for the ornamental fish trade by Monsongan fishermen since the 1990s. Based on Lunn & Moreau 2001, the trade commenced in 1995, and by 2001 20 fishers were actively involved.

In the past, up to 65 of the 89 fisher families have at some time been involved in OFC, but now only around 15 families still regularly collect ornamental fish. The FGD resulted in a list of 19 fishers in the village who are regularly or occasionally involved in OFC (Appendix 9), mostly though not all exclusively for the BCF. As in other villages, exact numbers vary, depending on other commitments, opportunities and "mood" etc. Two of these have been local buyers/financiers, buying fish from other collectors and holding them to sell on later to the buyers from Tumbak, but no longer play this role.

OF collection in Monsongan is generally a family affair, with husband, wife and children often involved in both the capture and post-harvest activities.

The main OFC fishing grounds are the area in front of the village itself, and the islands nearby, especially Pulau Bandang, Pulau Mansaleang and Pulau Satu, all of which are within 10 to 20 minutes of the village by ***katinting*** and mostly OF takes place within waters surrounding the village administrative area.

Mostly OF takes place at 1-3m depth, on shallow fringing reef flats where coral cover, sand and seagrass are mixed. The main fishing areas are shown in Figure 22.

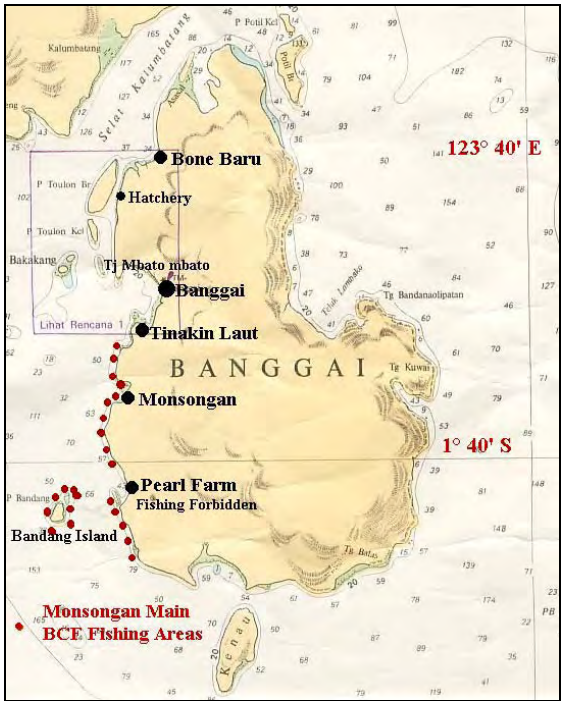


Figure 22 - Monsongan OFC Fishing Grounds in 2004

Tinakin Laut

The number of OFC reported by Lunn & Moreau was the highest for any village - 30 to 60 - in 2001. The DKP had expressed doubts on this - the Village Head (KD) confirmed that this was incorrect. There had been around 20 fishers who frequently engaged in OF in this predominantly Bajo village where most families live from fishing or related activities. Maybe a few more may have tried once or twice, at most 30. However there were many Tumbak and some Balinese fishers operating there in 2001, and an outsider might not have known the difference.

The KD said that the trade in BCF stopped because of two factors: few BCF left locally and not viable to go far for them (low price and few katinting owned by OF fishers)The OFC would start again if it was profitable for them to do so, main factor is having a regular buyer and viable price.

Two compressor fishers called in during the interview. Several compressor boats operate from Tinakin, but mainly for teripang and lobster rather than OF, a fisherman was recently paralysed after diving to over 30m for a long (unspecified) time, but the accident didn't happen locally, he was sent back after it happened, by his "boss" in Kalimantan. Seems he will simply be a burden on his family for the rest of his life. In spite of this sad example, the fishermen asked whether aid for purchasing more compressors might be available, specifically in order to collect more valuable ornamental fish. Simple advice on the risks of compressor diving and reducing them was given, and also reasons why such aid was unlikely given the risks to human health, even if it could be guaranteed that the compressors would not be used for any Destructive Fishing (DF) activities.

Tinakin Bajo OFC used to catch fish all around the village, to the South of Monsongan as far as Pulau Bandang and in Banggai Bay, but not on other islands, although Tinakin fishers do go to other islands for other marine products, e.g. as far as Bangkurung for teripang (sea cucucmber) and lobster. Tinakin Laut and Tolokibit OFC fishing grounds are shown in Figure 23.

Tolokibit

Tolokibit was visited because of the information that it was the main fishing ground of the Palu-based trader Pak Nyoman. At the KD's house, we were told the village Secretary (Sekdes) was the OF co-ordinator, and that we should go straight to him.

We were greeted by the strange site of an electric fan in the middle of the road near the house of the Sekdes, as a party of PKK ladies including the Governor's wife had just left! The son of the KD is a pupil at the Fisheries School in Banggai. Underwater photography was taken at the fishing ground and keramba holding pen. Information was from key informant interviews (Appendix 9) and observation.

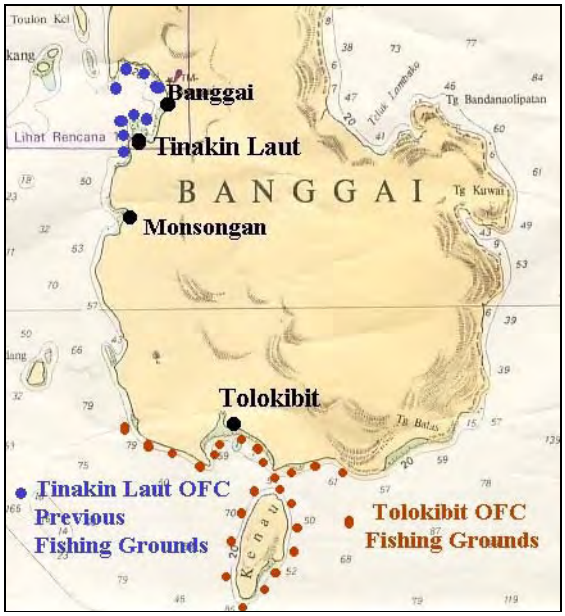


Figure 23 - Tinakin Laut Previous and Tolokibit 2004 OFC Fishing Grounds

Pak Basrun, the Sekdes has been in the OFT since the 1980's. According to him, Tolokibit was the village where it first started and Pak Nyoman, a buyer then based in Kendari but now in Palu, was the first trader in the Banggai. Pak Nyoman owns the boat, but gets the local fishermen to do the collection, co-ordinated by Pak Basrun. The boat would come with a compressor for catching the deeper water fish. Some of Pak Basrun's group "know" how to dive, but none has their own compressor. Toropot started OFC because of Pak Basrun he says, as he spent 4 months there around 1999, teaching the fishermen how to catch and keep the fish.

The main fishing area is in front of the village, but OF is carried out within all nearshore village waters, and around Kenau Island, which Pak Basrun says belongs to Toropot Village, even though it is very close to Tolokibit. However according to official records, Kenau Island is part of Tolokibit Desa territory.

Panapat

Information was gained mainly from Key Informant (KI) interview with the village head (KD) and a Focus Group Discussion (FGD) with a number of fishermen mostly involved in OFC (Appendix 9). Additional data was collected through informal conversations with other village residents and through observation. There were no noticeable discrepancies between fishermen's replies and information from the Village Head.

There are around 30 full-time fishermen in the village, about half of whom (15) are involved in OF, for the BCF and other species. Pak Rahman the Village Head has done extensive survey work throughout Bangkep over many years (over 7), and identified collection sites for the main OF species which the Balinese boats require. He himself is an OFC and he organises the other OFC, though the group has no legal status. Pak Rahman himself has a number of very official looking documents which he was proud to show relating to permits etc. However according to officials at the Fisheries and Koperindag, it turned out these are not appropriate for what he is actually doing. They were obtained in order to secure a bank loan.

The Balinese crew and Panapat fishermen go together, using equipment brought by the boats from Bali, and each fisher (local or crew) is paid according to the fish he collects. Exact numbers of Panapat fishers taking part vary, depending on Pak Rahman, who organises both where and who does collection, also (according to the OFC) on other commitments, opportunities and "mood" etc.

The fishing grounds are extensive, and cover most of the archipelago, with different species being sought at specific sites. Pak Rahman has established a rotation system, so that each collection site is left un-fished (at least as far as he knows) for several months before being fished again. The collection site (Tj Nggasuang) at which a biophysical survey was done had not been visited for some months and had very high BCF population levels, indicating that his claims to sustainability are most likely true. Panapat OFC main fishing sites are shown in Figure 24 and Table 11.

Figure 24 - Panapat & Bali OFC Fishing Grounds in 2004

Table 11 - Fishing Grounds of Balinese Visiting Panapat & Panapat OFC

Species	Fishing Ground Name (s)	Order of visit	Remarks
Piyama	Lumbi-Lumbia Reef Merpati Pulau Sagu Kalupapi Bontosi	1	Various areas around SW Peleng and Pulau Bangkurung (Bangkulu), usually unaccompanied
Letter six	Reef Timpaus Pulau Kenau	2	See Map, often accompanied
Capungan	Mbuang-mbuang Ngasuang Kokudan Pulau Lampu Pulau Kombongan Dusun Mandel	3	Always accompanied, by varying number of local fishermen
Kelompis	All	N/A	Not obvious, seems opportunistic

Toropot

Capungan or BCF is only caught fairly close to the village, mainly in the large lagoon where seaweed is also cultivated, and on the reef flats around the nearby islands, but rarely as far as Bokan Island. This area is that covered by the extract from Chart 311 (Dinas Hidro-Oseanografi (1985) in Figure 25.

Letter six and other species are caught but details of fishing grounds were not available as these fishers were out fishing at the time of the visit.

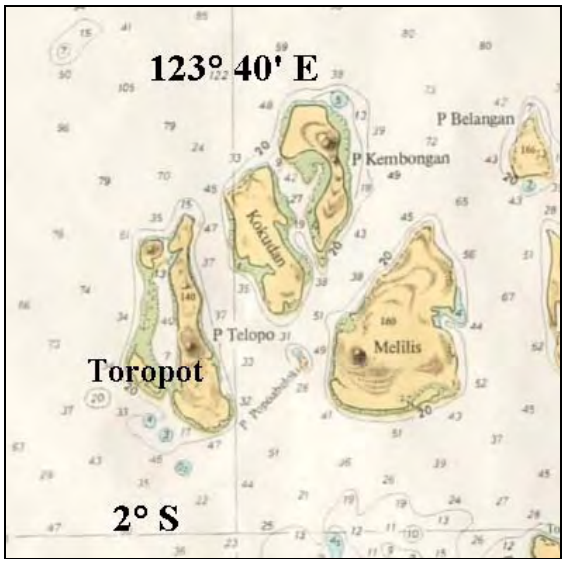


Figure 25 - Toropot BCF Fishing Grounds

3.5.1.2. Collection Methods and Species

Most collection for BCF is by use of various types of net. However potassium cyanide (***potas***) is frequently used for other species. Local OFC seem to catch a relatively restricted number of species, though OFC from outside the area, viewed as "thieves" by locals, and operating outside the law, reputedly take many more species, and use cyanide even more often than locals. Collection methods data for each village are given below. Detailed description of equipment used in the capture, holding and care of the BCF (and often other ornamentals), including dimensions and prices, is given in Appendix 10.

Bone Baru

The Bone Baru fishermen were surprisingly open about the use of poison (***potas***, or potassium cyanide pills) for fishing, though not so open about the use of explosives. Indeed a full demonstration of cyanide fishing used for both ornamental and food fish capture which the team was allowed to photograph and film was given twice, on two separate visits – as the first time there was a camera malfunction These can be seen in Appendix 7, and Appendix 12. Capture methods were also shown without using potas.

The Tumbak crew met in Bone Baru said that they no longer catch but only buy OF. Originally these buyers were OFC who used almost 100% cyanide for ornamental fish collecting, and who admitted that they had introduced this technique to Banggai fishermen. By 1999, they had been taught net capture techniques by IMA, using Cang type nets (Figure 20), and the crew said they and had taught the Bone Baru and other villagers to use theses Cang nets, as previously they taught the use of cyanide. However, in 1999, the Tumbak fishers admitted to still using cyanide outside their local area, though not anymore within the conservation area near their village (Moore 1999). While the current status of cyanide use by Tumbak fishers is unknown, the Bone Baru fishermen still use both cyanide and nets or frequently both together.

According to the FGD and OFC giving demonstrations, two net types are used by Bone Baru OFC: ***Cang*** (indeed similar to nets seen in use in Tumbak in 1999), and ***Bundre***, which are shown in Figure 26 and whose use is shown in Appendix 7 and Appendix 16.

Three Bundre Fishermen

Cang - shown in BCF Packing Shed

Figure 26 - Net Types Used in Bone Baru - Bundre and Cang

The species collected by Bone Baru OFC are listed in Table 12. In addition to the species mentioned by the Bone Baru fishers, the Tumbak buyers met in Bone Baru say they buy juvenile barramundi cod ***Cromileptes altivelis*** and juvenile Napoleon wrasse ***Cheilinus undulatus***. The latter is a protected species, and only individuals between 1 and 3kg weight can be traded. According to the Tumbak buyers this regulation is eluded (as it was in 1999, Moore 1999) by declaring them as "angel biasa" - ordinary angel fish - on cargo manifests. However as the crew were about to depart for Toropot, and had already made themselves late by assisting with the demonstration of packing, and other information, this line of enquiry could not be further pursued.

Table 12 - Main Ornamental Fish Caught by Bone Baru OFC

Local Name	English Name	Latin Name	Main Capture Method
Capungan	Banggai Cardinal Fish	*Pterapogon kauderni*	Net and oar
Letter Six	Palette Surgeonfish	*Paracanthurus hepatus*	Cyanide
Klompis	Clown Fish	*Amphiprion sp.*	Net and oar
Angel	Blue-ringed & other Angelfish	*Pomacanthus annularis/sp.*	Cyanide
Kepekepe	Butterfly fish	Chaetodontidae	Cyanide

Note that Bone Baru fishermen were offered up to 5,000 per fish for lion fish (Scorpionidae), but well aware of the risks of exceedingly painful (and expensive to cure) injury from contact with the poisonous fin rays, the fishermen refused. It is possible that small numbers of other species may occasionally be captured/traded.

Environmental Aspects

All methods seen result in considerable mechanical damage to the reef if used in a live coral area, especially where there are branching coral species. The Biophysical survey results are given in more detail in Appendix 3. It would seem that the methods used are likely largely to blame for the high incidence of rubble and soft coral cover shown in the manta tow and line transect data (Figure 27), as well as by the photographic/video evidence in shallow water areas (Appendix 7). Unlike that seen in deeper water areas down the reef slope, this damage was not typical of bomb fishing related destruction.

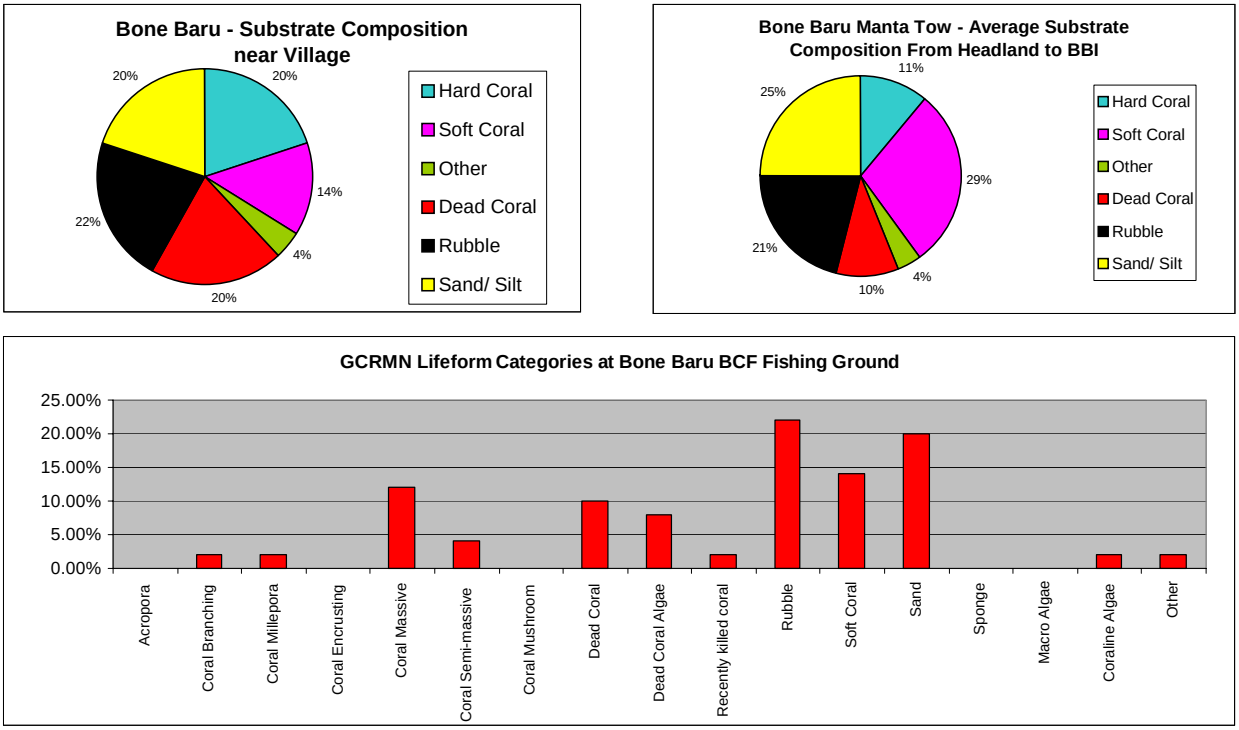


Figure 27 - Substrate Composition and Reef Condition in Bone Baru

The BCF population survey (2 transects of 50m X 4m) showed the Bone Baru fishing grounds to be in a severely depleted condition, with only 14% as many fish per diadema urchin as in a nearby un-fished area (the Pearl Farm, see Monsongan 2.d.) and a low (1.38) juvenile/adult ratio, indicating not only over-fishing but also poor recovery outlook. A summary of the data is shown in Table 13. From this data it is clear that the low BCF population is not due to lack of habitat, as the number of diadema urchins is clearly largely sufficient.

Table 13 - Summary of BCF Population Data Bone Baru

	Bone Baru Fishing Ground	Pearl farm Un-fished Area	Ratio Bone Baru/Pearl Farm
Juvenile BCF	52	339	15%
Adult BCF	42	242	17%
Total BCF	93	580	16%
Juvenile/Adult	1.38	1.50	91%
Diadema Urchins	460	279	165%
BCF/Urchin	0.28	1.99	14%

Juveniles were defined as fish under 3.5 SL (Standard Length), the lowest recorded breeding size, however most juveniles seen were well below this size, with very few fish between 2cm and 5cm SL being seen. As at Monsongan, observations seem to support the theory of an ontogenetic shift between sea anemone habitat for smaller juveniles, including the smallest fish seen (around 1cm SL), while all size classes over about 1.5cm SL were seen in diadema urchins (the majority of fish) and mainly large fish of 4.5cm SL and above seen in branching coral stands, with no small juveniles seen in the branching coral habitat.

The use of cyanide for some OFC activities has effects both upon the sessile invertebrates such as the coral itself, and upon both target and non-target fish. Fish receiving a lethal dose will die,

either immediately or soon afterwards. Fish receiving a non-lethal dose will be affected long-term. Target fish are likely to die either in transport or soon after purchase. Non-target fish will be unlikely to compete in the natural environment and will most likely fall prey to predator species or to disease. Therefore the habitat (on which coral reef fisheries depend) and the fish stocks themselves will be adversely affected. It is likely that some of the dead coral seen is due to cyanide use, and some of the recently killed coral (that not due to COT attacks and not consistent with temperature related bleaching patterns) is almost certainly the result of cyanide use.

Potas about to be used for OFC

Chasing fish with an oar

Coral smashed by the oar

Figure 28 - Destructive Ornamental Fish Capture Methods in Bone Baru

Cyanide is not however used for the capture of BCF, because the BCF is so easy to catch without cyanide - so why incur the expense? The method used to chase BCF into the net, whether ***Cang*** or ***Bundre***, is to scare the fish into the net with an oar. In sandy sea urchin areas, as in Monsongan, this is achieved by lifting one or more urchins with the oar. This action seems to cause little damage to the habitat, and the urchins seem to se-settle on the substrate afterwards, albeit a few broken spines were seen in collection areas. However in coral areas, a crashing noise is produced by breaking nearby corals with the oar. The fishermen said that the reason is not generally to chase out the fish, but that it is the noise which scares them. This technique is really a type of miniature "***muro-ami***", and is clearly not ecologically sustainable as can be seen in Figure 28. More detail is given in Appendix 12 and Appendix 16.

Changes in CPUE and overall catch are shown in Table 14. Catch data varied widely between collectors (FGD and KI), but all agreed that average number of fish caught per hour (CPUE) is at best 1/10th of 1993 levels.

Table 14 - Changes in CPUE and Catch Data over time (BCF) in Bone Baru

Year	Average Fish/day	Hours/trip	Fish/hour	Catch per week	Sales
1993-2000	1,000 - 10,000	1 hour	Over 1,000	5,000 - 10,000	Most fish
2003/2004	100-1,000 most 200-300	3-4 hours	25 - 330 most 50 - 100	Around 2,000	Many left

Monsongan

Detailed description of all equipment used in the capture, holding and care of the BCF (and often other ornamentals), including dimensions and prices, is given in Appendix 10. On OFC days, fishers would generally make two fishing trips, which would usually be between 07.00 am and 10 am to 12 noon. A photographic record of the capture and holding of BCF in Monsongan is provided in Appendix 17 and video footage is contained in Appendix 7.

There does not seem to be a wide range of species collected (see Table 15), and unlike other villages visited during the survey, "letter six" (*Paracanthurus hepatus*) does not seem to be a target species in Monsongan. When shown pictures of coral reef fishes, the fishermen pointed to the moorish idol as a species sometimes collected and sold. Note that ***Tayung*** means sea urchin in Bajo language.

Fishermen reach the sites with sampans (powered by ***katinting*** or unpowered) or small ***bodi***, (see Appendix 2, A2.5) and free-dive using traditional goggles made of wood and glass (Appendix 10) and the net type called ***Cang***. A wooden oar or paddle, also used to power the sampan, is used to chase fish into the ***cang*** net. This method is used for BCF and clownfish, but how the fishermen catch angel fish or moorish idols is not known. Unlike Bone Baru, cyanide use was denied - how true this is we could not check in the limited survey time. Compressors were seen in the village, and are definitely used for sea-cucumber harvest, it is not clear whether ornamental fish are also sometimes targeted.

Table 15 - Main Ornamental Fish Species collected by Monsongan OFC

Local Name	English Name	Latin Name	Capture Method
Bebese Tayung	Banggai Cardinal Fish	*Pterapogon kauderni*	Cang net & oar
Kolompis	Clown Fish	*Amphiprion sp.*	Cang net & oar
Angel	Blue-ringed & other Angelfish	*Pomacanthus annularis/sp.*	Unknown Cyanide suspected
?	Moorish idol	*Zanclus cornutus*	Unknown

Environmental aspects

Capture methods demonstrated would result in some mechanical damage to the reef if used in a live coral area, especially where there are branching coral species, though not as severe as the Bone Baru demonstration methods. Although it would seem that the methods used are likely partly to blame for some of the rubble observed during the manta tow and line transect data, the damage is relatively light and the substrate is in relatively good condition for such an intensively harvested area, with 45% live hard coral cover within the BCF survey area, and around 30% cover over the whole manta tow, some of which passed over areas dominated by sand and seagrass.

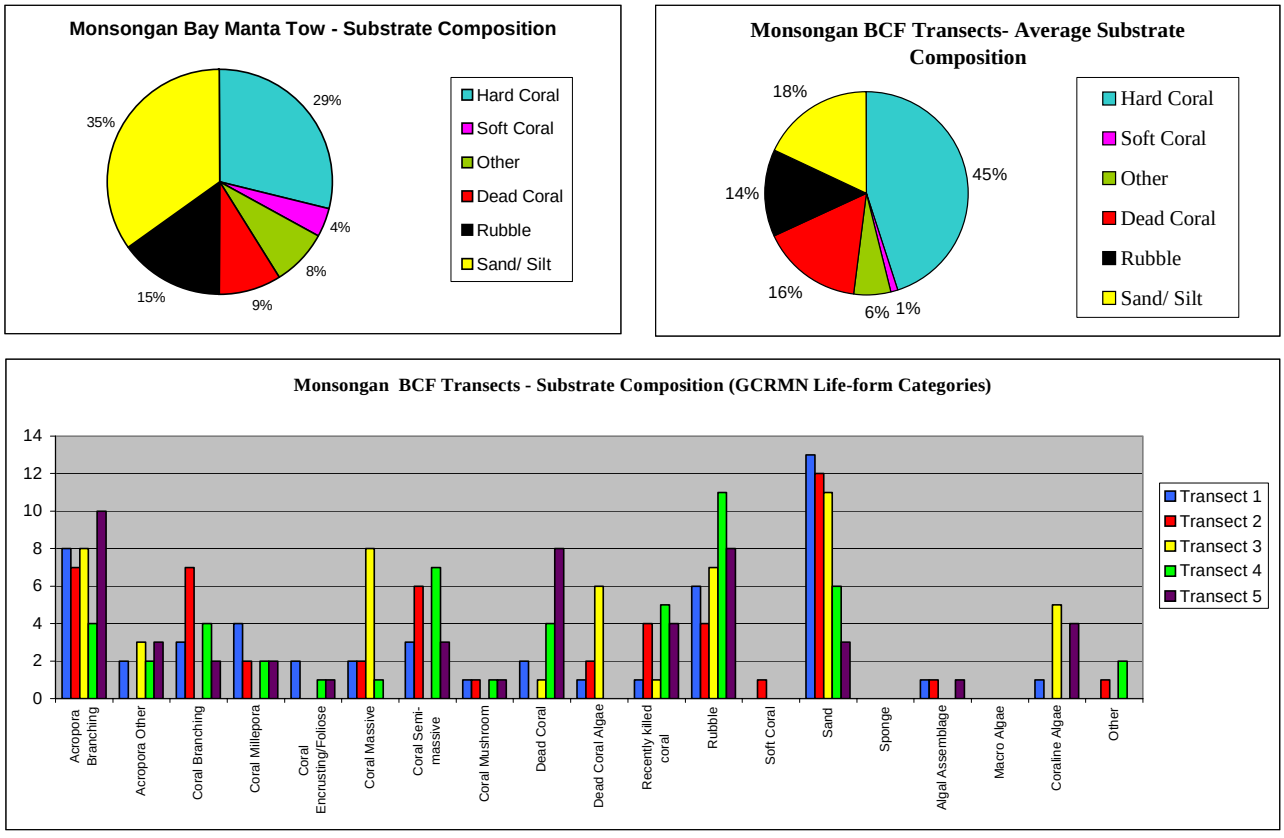


Figure 29 - Substrate Composition and Coral Condition in Monsongan Bay

More detailed data are shown in Appendix 3, but substrate composition data for Monsongan based on the BCF survey transects and a Manta Tow survey is given in Figure 29.

The overall coral condition for Monsongan Bay was 40% Good and 60% Poor based on the GCRMN coral reef condition categories (English et al 1997, Appendix 8). The most worrying feature is the quite high percentage of recently killed coral (6%), probably partly due to OFC, partly to COTs and other factors.

The Pearl farm Bay visited by the team is also situated in Monsongan Desa administrative area, and is strictly off limits to local fishermen. As such it acts as a de facto protected area for the BCF. This un-fished BCF population can therefore provide good data for comparison with BFC collecting sites. Although one Key Informant did give information suggesting there had been some collection there, if it did occur it was several years ago and most likely not very intensive. A summary of the BCF population data for Monsongan and comparison with the Pearl Farm population is given in Table 16 below. The figures given for each location are averages per transect (5m X 4m) at each site, not overall figures, and therefore are comparable.

The BCF population survey showed the Monsongan fishing grounds to be in a severely depleted condition, with only 7% as many fish per diadema urchin as in a nearby unfished area (the Pearl Farm). However the juvenile/adult ratio was high, around 4 times that in the unfished area. This may indicate good breeding success, possibly due to the relatively intact habitat, and is a hopeful sign for stock recovery. Juveniles were defined as fish under 3.5 SL (Standard Length), the lowest recorded breeding size, however most juveniles seen were well below this size, with very few fish between 2cm and 4cm SL being seen. It is clear from the number of diadema urchins in Table 16 that habitat is not a limiting factor, and that therefore fishing pressure is likely to be the major limiting factor.

Table 16 - Summary of Monsongan BCF Population Data

	Monsongan Bay Fishing Ground	**Pearl Farm Unfished Area**	**Monsongan/ Pearl farm Ratio**
Juvenile BCF	76	339	22%
Adult BCF	27	242	11%
Total BCF	103	580	18%
Juvenile/Adult	6.46	1.50	430%
Diadema Urchins	745	279	267%
BCF/Urchin	0.14	1.99	7%

It is worth noting that the majority of collection seems to take place from BCF groups living in diadema colonies on mainly sandy areas between the coral outcrops, where collection is much easier. Data is not sufficient to make a categorical statement, but there does seem to be an ontogenetic (age-related) shift by at least some BCF, with mainly very small juveniles found in sea anemones (most below marketable size), whereas large fish (often above best market size) dominate in hard coral areas (acropora and non-acropora, branching or semi-massive colonies). Although all BCF sizes were seen in diadema urchins, relatively few market sized fish were observed at this and other sites in the other two habitats, and the majority of market sized fish seen were in the diadema colonies. This observation seems to agree with data collected by Vagelli in 2001 and 2002 (Vagelli 2004a).

An elderly key informant who has lived all his life in the village, said that until about 15 years ago, BCF and other small fish were very numerous, even coming right up to the shore in front of his house. However since the heavy collection started, numbers have greatly decreased and there are no longer many fish near his house. He stated that populations of BCF and other small fish

were already much reduced before the major earthquake in 2000, but that the event did seem to have accelerated the decrease in population.

Average catch figures are 100-200 fish per day, and around 1,000 fish per week. At previous demand levels of 10,000 to 25,000 fish per week, all fish would have been sold. However with around 15 fishers and a demand reduced to only 7,000 to 10,000 per fortnight, many fish are likely to remain unsold. During the most recent buyer visit (previous week) 3,000 fish were bought. Catch data varied widely between collectors (FGD and KI), but all agreed that the average number of fish caught per hour (CPUE) is lower than in the 1990s, when 1,000/day, although not routine, was not unusual.

Tolokibit

As mentioned previously, the village fishermen do not own compressors but use them for OF when the Luwuk buyer boat comes equipped with one. The Tumbak buyers would take BCF plus any other ornamental fish available, even if only 2 or 3 fish.. The BCF are in the shallow waters, piyama and letter six in deeper waters beyond the reef crest. The main OF method is using a Cang for BCF, but with a special tool designed by Pak Basrun, Sekdes and OFC co-ordinator, to chase the fish without damaging the coral (Appendix 17). The main species are shown in Table 17.

Table 17 - Main Species caught by OFC in Tolokibit

Local name	English Name	Latin Name	Collection Method
Piyama	Blue-ringed & other Angelfish	*Pomacanthus annularis/sp.*	Compressor
Letter six	Palette Surgeonfish	*Paracanthurus hepatus*	Compressor
Tompel	Clown Fish	*Amphiprion sp.*	Unknown
Capungan	BCF	*Pterapogon kauderni*	Cang net & special tool

All though no quantitative data is available, extensive snorkelling at Tolokibit revealed an unusual mechanical damage pattern to some of the coral reef, which was found to be due to abalone fishing, where whole coral heads or large parts of coral colonies are overturned to remove the abalone sheltering below them.

In spite of this, overall the reef was in average condition with relatively extensive areas approaching or in the GCRMN/AIMS "Good" category of 51-75% coral cover (English et al 1997). The BCF population seemed to be quite high, although some areas had evidently been depleted. Several thousand BCF were seen and recorded in a ***keramba*** or holding pen awaiting collection, which was overdue (Appendix 7).

Panapat

The Panapat OFC use special equipment brought by the Balinese boats with which they go fishing. The equipment (fine mesh nets, said to be of material similar to mosquito netting) stays on the boats, and therefore not available for inspection by the team. Apparently 3 types are used: "Chang" (similar to that used and photographed in Bone Baru and Monsongan), "Seser" and "Jaring kelambu", see drawings in Appendix 10.

The main point made by the KD is that the fine mesh does not damage the fish, so mortality is reduced and more fish are acceptable to the buyers. The Balinese boats arrive, report to the Village Head, then follow a schedule shown in Figure 19 and Table 11, collecting first "Piyama" and "Letter six", which are hardier and survive longer in transport, returning to Panapat for "Capungan" or BCF before the return trip to Bali. The Village Head directs the collection of BCF, on a rota system which he says ensures that no area is harvested at too frequent an interval, thus maintaining high population levels. Based on data from the collection site visited (Appendix 10), this system would seem to be working and could be sustainable from a conservation viewpoint.

Table 18 - Main Ornamental Fish caught by Panapat/Bali OFC groups

Local Name	English Name	Latin Name	Main Capture Method
Capungan	Banggai Cardinal Fish	*Pterapogon kauderni*	Using barrier and chase nets
Letter Six	Palette Surgeonfish	*Paracanthurus hepatus*	
Kolompis	Clown Fish	*Amphiprion sp.*	
Piyama	Blue-ringed Angelfish	*Pomacanthus annularis*	

No quantitative substrate data was collected. However some areas of very high live coral cover were seen, in particular on the reef crest and upper slope outside the Panapat collection site lagoon at Tanjung Kasuang where, in spite of some traces of bomb, poison and anchor damage, live hard coral cover exceeded 80%. This site is therefore in the GCRMN category "Very Good" (76-100% live hard coral cover), for which (based on presentations by LIPI scientists and others at the 10th ICRS in Okinawa in June 2004) only around 5% of Indonesian reefs are now thought to qualify[1].

Toropot

During the field visit to Toropot, a demonstration of BCF capture using two methods was given. One was similar to Monsongan and Bone Baru, using the ***Cang*** style net, the other was using a racket shaped net only seen here. This is shown in Figure 30. In addition, Toropot OFC are involved in collection of other species, especially ***letter six***, though the methods used were not discussed. The main species caught are shown in Table 19. It is highly suspected that Letter Six and Piyama are caught using cyanide as in Bone Baru.

Table 19 - Main Ornamental Fish caught by Toropot OFC

Local Name	English Name	Latin Name	Main Capture Method
Capungan	Banggai Cardinal Fish	*Pterapogon kauderni*	Cang Bundre and Racket type nets
Letter Six	Palette Surgeonfish	*Paracanthurus hepatus*	Compressor?
Kolompis	Clown Fish	*Amphiprion sp.*	As for Capungan
Piyama	Blue-ringed Angelfish	*Pomacanthus annularis*	Compressor?

Racket-shaped net in use ***The harvest***

Figure 30 - BCF Collection in Toropot

[1] GCRMN = Global Coral Reef Monitoring Network; ICRS = International Coral reef Symposium; LIPI is the Indonesian Institute for Science.

3.5.2. Market Chain

The market chain for BCF in 2001 was well researched by Lunn & Moreau (2001), and is given in Figure 31. In 2004, 3 distinct market chains were discovered, and these are described separately below.

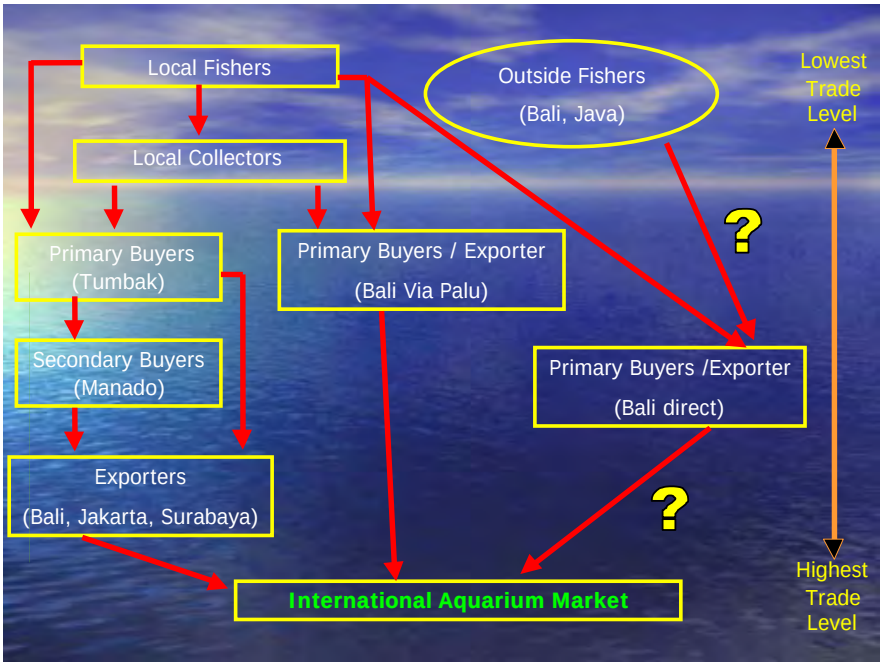


Figure 31 - Market Chain for BCF in 2001 (Lunn & Moreau 2001)

3.5.2.1. Via North Sulawesi

This was the most frequently encountered route. Although the transport methods and transit points vary, as shown in Figure 32, in all cases the initial buyers visiting Bangkep are from Tumbak village in North Sulawesi. This village is one of three where the USAID community-based marine and coastal management programme Proyek Pesisir which finished in 2004 was in operation (Appendix 11).

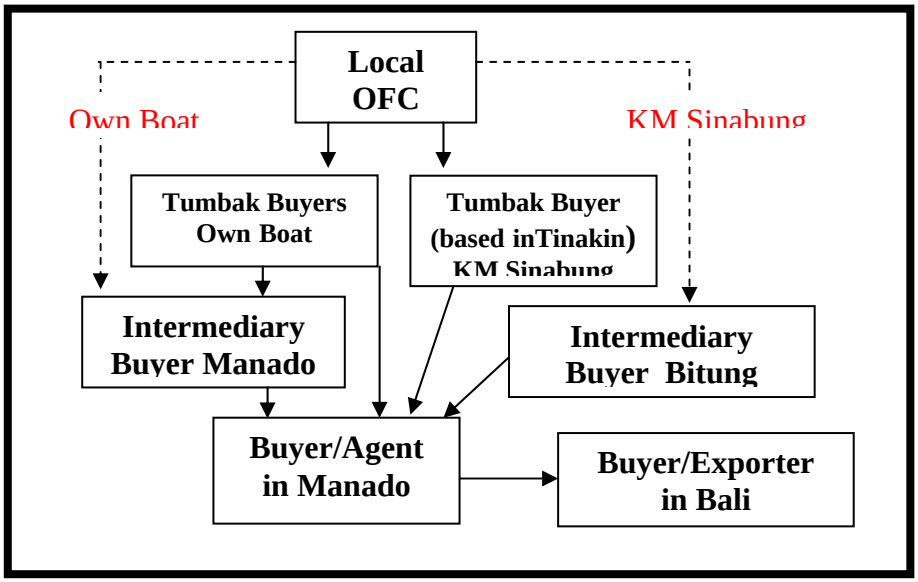


Figure 32 - North Sulawesi Trade Route in 2004

The dotted lines and red letters show routes which were tried unsuccessfully by local OFC, failure was due to high mortality (lack of proper packing equipment) and low prices paid on arrival -

similar to those paid in Bangkep, insufficient to fully cover additional transport costs. The route followed by the Tumbak buyers using their own boats is shown in Figure 33. Monsongan Tolokibit and Kalupapi are only visited now if the fish from Bone Baru and Toropot are insufficient. According to the Tumbak crew, Monsongan BCF fish are darker in colour and less desirable than those from Bone Baru or Toropot, though no differences could be seen by the untrained eyes of the survey team.

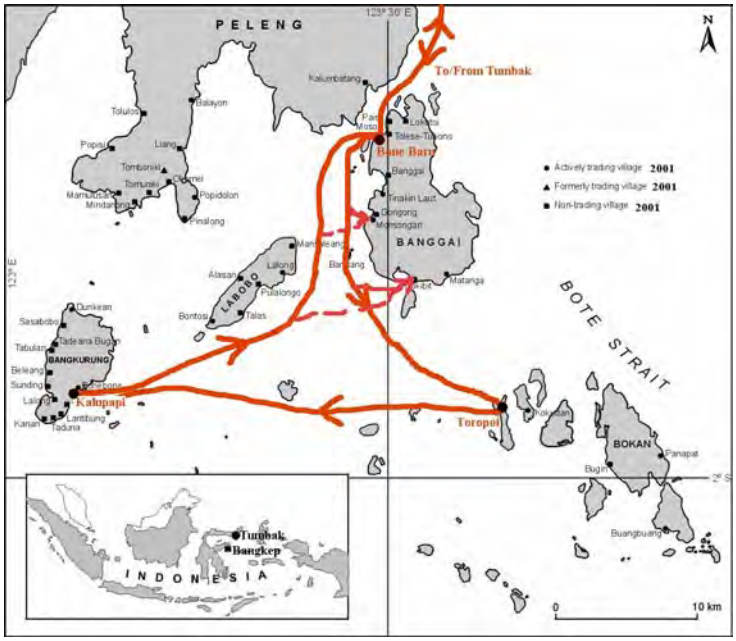


Figure 33 - Route of Tumbak buyer boats 2004

More detail per village using these routes is given below. Figure 34 shows 5 boxes of Banggai Cardinalfish on the quay in Banggai, waiting to be loaded on KM Sinabung, with oxygen tank covered by sack cloth and bags of fish being a Tumbak vessel.

Figure 34 - BCF ready for loading on KM Sinabung

Bone Baru:

According to the Tumbak traders, the DKP and other informants, Bone Baru is now the main centre of OFT via Tumbak/Bitung, whereas this role used to be played originally by Tolokibit, with shift to Tinakin Laut by 2001 and it seems Monsongan has also been a major if possibly not the main trading centre in-between. All the buyers visiting Bone Baru are from Tumbak, according to KI and FGD. However two major trading routes have developed.

The first is via Tumbak buyers coming with their own boats and taking fish directly back to Tumbak aboard these vessels, from whence fish are shipped to Manado by road.

The second is through Tumbak buyers who use the fortnightly PELNI ship service to Bitung, KM Sinabung, and then from Bitung fish are transferred to Manado by road. The sales/packing process takes place in Bone Baru on Thursday afternoons/evenings. These buyers have a base (belonging to a family member) in Tinakin village, which is used as a transit place/temporary storage for the fish between collection from Bone Baru and placing onboard KM Sinabung, and also seems to be used as a storage facility for equipment. One of the Tumbak vessels and KM Sinabung are shown in Figure 35.

KM Sinabung in Banggai Harbour

KM Nurul Bahari in Bone Baru Bay

Figure 35 - Vessels used for transporting Ornamental Fish caught in Bone Baru

It seems that transactions form Tumbak fishermen to Manado-based operations takes place either at the point of landing (Tumbak or Bitung) or in Manado. From Manado it seems the fish are generally air-freighted to Bali.

Two regular visiting boats are: KM Rizal Jaya and KM Cahaya Bobolan, which according to the FGD generally load on a Friday morning, although the week of our visit they came on the Wednesday, while the team were in Panapat, so that the team missed the opportunity of witnessing the sales and packing process on this occasion. The Tumbak vessel met in December in Bone Baru was KM Nurul Bahari. Although in 1999 (Moore 1999) Tumbak buyers also took part extensively in collection, now their role is limited to that of intermediary buyers and transporters. According to the crew of Nurul Bahari, this has been a gradual process, and they said they feel it is "right" that local people should also be involved and receive an income form their resources. This sounds very like a "Proyek Pesisir[2]" catch-phrase, and it is worth pointing out that Tumbak was one of three main Proyek Pesisir pilot sites for coastal community based resource management.

The two boats not seen by the team were estimated at around 5 tonnes by the Bone Baru fishermen, with a crew of 7: Captain, Engineer, 4 sailors and a cook.

The KM Nurul Bahari consists of 5 members, though there were also 2 Tumbak people as passengers on board, visiting relatives in Toropot. The main duty of the sailors is the care of the cargo (the fish), especially regular changing of water and refilling bags with oxygen (every 10 hours in 1999). The round trip would usually take 10 days. Crew and owner have a special link to Bali - as "***keluarga***" (one or more family members) work in the Bali OFT. However they still have to go through the Manado buyers to ship to Bali, and only receive relatively low prices in view of the expenses incurred. More detail on prices and incomes is given in Chapter 6.

According to the FGD, on each return trip the boat would carry about 200 -300 bags of fish, each with around 30-35 fish, half-filled with sea-water, half with oxygen. This gives a total of around 7,000 – 10,000 fish. With respect to all ornamental fish species, the fishermen stated that any shortfall in numbers (for the Tumbak buyers using their own vessel) was made up from Toropot and Kalupapi, the other villages on the Tumbak buyers regular route as in Figure 33. According to the Nurul Bahari crew, sometimes they will also call in to Tolokibit and/or Monsongan. The Bone Baru fishermen and the Tumbak traders said that ***Letter Six*** were mainly from Bokan Kepulauan, and most often bought in Toropot.

[2] Proyek Pesisir: a long-term NRM (US AID) programme in conjunction with URI (University of Rhode Island) which has just finished. The other two North Sulawesi pilot villages were Blongko and Talise.

The co-ordinators (Pak Abdul Rahman and Pak Ali Yasin) provide a link between buyers and the other fishermen at the time of buying/packing etc, but are not local financiers and do not buy from or keep fish for other fishermen. Their responsibilities include:

- taking orders from the buyers (though often numbers are often only stated when the buyers arrive to pack)
- allocating a quota based on the order volume to each fisherman,
- Financial transactions (receiving money from buyers, distributing to fishermen)

As a "perk" for their extra work, these co-ordinators receive a small extra allocation of fish at each sale, usually around 50 fish (worth around IDR 15,000 or just under $2).

Monsongan:

Based on Lunn and Moreau (2001), at that time all Monsongan fishermen sold direct to the Tumbak buyers, who used 3 boats and came more frequently than once a week. Local fishermen sold 6,000 to 10,000 BCF per buyer visit, generally by direct sale without local middlemen. Each fisher made his/her own bargain with the buyers, and it seems that there was more variation in price. The trade route in 2001 is shown in Figure 36. With the exception of the local buyers who no longer operate, this route is still used though infrequently.

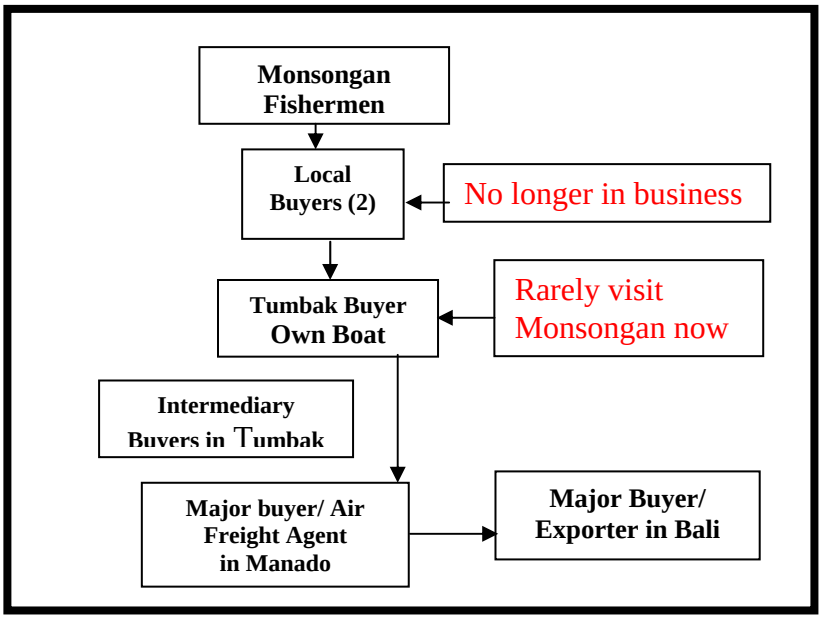


Figure 36 - Trade Route from Monsongan in 2001

The current major Market Chain for Monsongan via KM Sinabung, with fishermen trading directly to the buyer, is shown in Figure 31. As KM Sinabung docks in Bitung, not Manado, it seems some buyers come to Bitung to collect the fish there, while sometimes the Tumbak Buyers take the fish to Manado from Bitung themselves.

In both cases it seems that the general means of transport is by road, and that price generally varies little - at best a refund of transport costs incurred. Mortality was said to be around 10% during transport to Manado using KM Sinabung, no indication of mortality previously when Tumbak buyers came in their own boats, or further up the chain.

In 1999 (Moore 1999) mortality for transport of ornamental fish from Banggai to Tumbak was generally in excess of 50%, sometimes as high as 80%. Based on information from Bone Baru it would seem that there has been some reduction in mortality levels since then. The boats from Tumbak which (used to) visit Monsongan were said to be around 5-6 Tonnes, and were the same which visit Bone Baru.

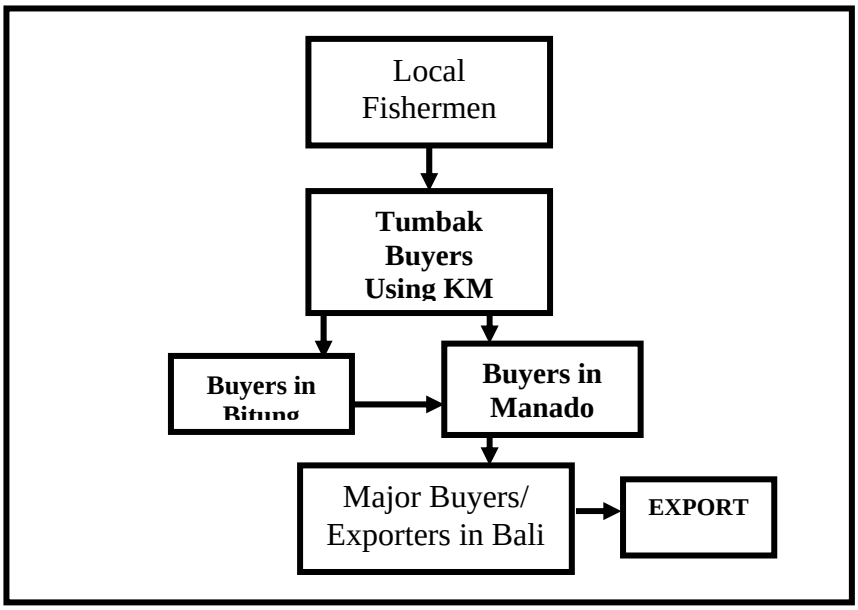


Figure 37 - Current Main Market Chain from Monsongan using KM Sinabung

As for Bone Baru, one main barrier to direct access to the MV Sinabung route for local fishermen, even if they had a good buyer contact on arrival, would seem to be lack of on-site packing equipment, especially oxygen. However, there is no fishers association, formal or informal, so that this lack of organisation would also pose a barrier should local OF collectors wish to take advantage of the opportunity offered by MV Sinabung.

Tolokibit:

It seems that the Tumbak route has only ever been a minor outlet for fish from Tolokibit, however if Tumbak buyer do call, the OFC in Tolokibit do collect for and sell fish to them, both BCF and any other ornamental fish they may succeed in capturing. When the boats do visit, they usually call in on the way to Toropot (and sometimes also Kalupapi), placing an order, then collect on the way back.

Toropot:

Tumbak boats are the main buyers for Toropot OFC. In addition to BCF, letter six is a major species traded via this route. With the exception of local buyers, the route is as shown in Figure 30. Although not mentioned by the Toropot OFC met during the survey (only a small proportion of all OFC as most were out fishing), according to Toropot residents met elsewhere some Toropot fish are brought to Banggai and sold to the buyers using KM Sinabung, but this is not confirmed. Toropot OFC have tried taking fish directly to Tumbak or Bitung using local boats but they made losses due to high mortality and low price paid on arrival and no longer attempt this.

3.5.2.2. Via Palu and Other Transit Points

In Tolokibit, the main trading route used to be via Kendari, but now is via Luwuk and Palu, as shown in Figure 38. This is the only OF operation which reports to the Karantina in Luwuk, as in fact all, wherever they are based, should do.

The clearance documents he requests are to Surabaya. It is not know what route the fish take to export from there. However this is not done in an entirely truthful manner, as the owner of the business poses as a sole trader to reduce fees, whereas he actually runs a registered company. The fish are transported overland to Palu, where they are air-freighted to Surabaya.

However it seems that there are still some vessels (mainly Balinese and Madurese) operating via Kendari, the capital of South east Sulawesi, including at least one which also calls in at Luwuk. Apparently this crew used to work with local OFC, but once they had learned where the good fishing sites were they decided to cut out the local connection.

In view of information received at the Palu stakeholder meeting of three ornamental fish trading vessels carrying fish mainly from Bangkep but operating without permits being arrested in Kendari and all their fish released, it is clear that this route was indeed still in operation in 2004. Similar reports have also been received by email from contacts in Wakatobi National Marine Park, South of Kendari.

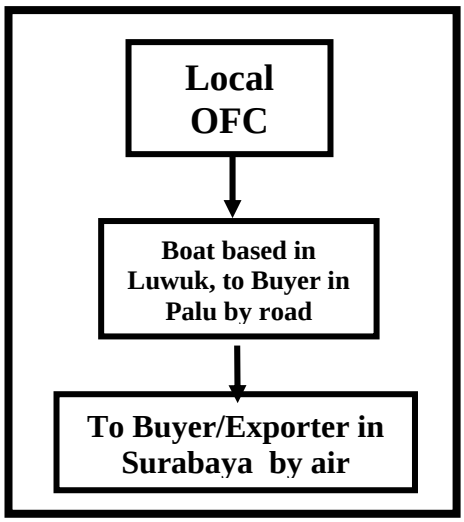


Figure 38 - Route via Luwuk and Palu

According to the staff at CV Dinar in Bali, several vessels were said to operate via Kendari to Denpasar. It is also possible that some fish may be destined for Java, and be exported through Surabaya/Jakarta though Bali seems to be the main destination of ornamental fish from the area.

Based on information from a variety of sources, some fish also transit via Makassar, capital of South Sulawesi and a (minor) international airport, though little detail is available Some of these fish are actually destined for the local domestic market, not for export, and go no further. Sources include Palu BKDSA, an aquarium owner in Makassar (actually a dentist, the aquarium is used to entertain patients while waiting), and staff of CV Dinar in Bali (see Appendix 11).

3.5.2.3. Direct to Bali

This route has been in operation since the early 1990s in Panapat. There are 3 boats which visit the area in turn (1 alone then 2 together, sometimes all three together) at approximately 2 weekly intervals during the "season", less frequently at other times. The three visiting boats are: KM Mutiara, KM Sumber Rejeki and KM Marsela. Village fishermen accompany the Balinese crew, and all take part in the collection, each fisher (local or boat crew) being paid the same per fish. The route is shown in Figure 39

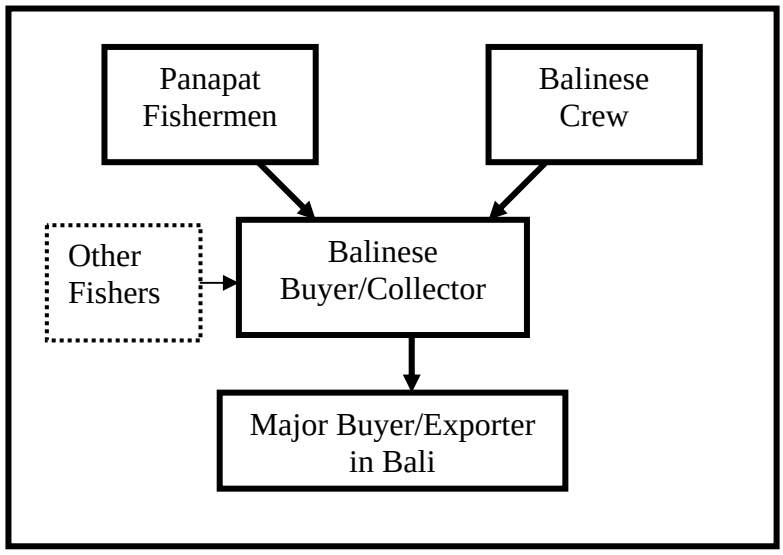


Figure 39 - Trade Route from Panapat in 2004

Before becoming Panapat village head Pak Rahman was in full-time OFC business, often going back and forth between Panapat and Bali, and has extensive knowledge of prices and some knowledge of onward trading systems in Bali. Since becoming village head he no longer has time, and says his business has greatly suffered as a result. Family tragedy (expensive but unsuccessful treatment for cancer of an adolescent child) has also affected both the OFC business and the family's personal wealth.

As co-ordinator, Pak Rahman is now responsible for 3 main functions:

- Co-ordination with the Balinese buyers (two-way source of information)
- Indicating fishing grounds (guide)
- Financial transactions (receiving money from buyers, distributing to fishermen)

The "other fishers" in Figure 39 are fishers from villages along the collection route of the joint Bali/Panapat OFC expeditions, including from Toropot, where although the village head and elders (who have strong tires to Tumbak buyers) have forbidden entry to the Balinese boats, with or without Panapat OFC, they still manage to buy surreptitiously from fishermen, though the mechanism is not clear.

In addition to this overt route, many vessels from Bali (and Java) are reputed to operate without co-operation with locals, totally illegally and are both resented and sometimes feared by local OFC and other fishers. This route is shown in Figure 40.

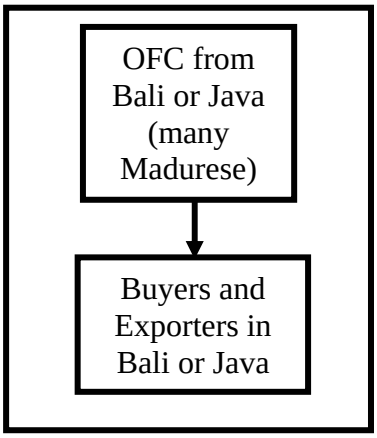


Figure 40 - Non-Local OFC Trade Route

3.5.3. Handling Post Harvest, during Holding, Packing and Transport

Handling of ornamental fish is much improved compared to conditions at the start of the trade, when mortality was extremely high, largely because oxygen was not yet used in many cases. However at most stages there is still much room for improvement and mortality is still a significant problem. Handling is reviewed at different stages and locations.

3.5.3.1 Post harvest and Local Holding

The way fish are treated after capture until a buyer comes to pack and transport them varies depending on the location. This stage of handling is shown by village below.

Bone Baru

Handling data is quite detailed for Bone Baru, as all stages were witnessed first hand, during ordinary everyday OFC activities as well as during special demonstrations by local OFC of specific OF activities. More details can be seen in Appendix 16. Immediately after capture, fish are placed in a variety of sea-water filled containers on the OFC sampan. Very little sorting takes place at this stage, so that significant numbers of over or under-sized fish, damaged fish or in the case of BCF, brooding males, are taken back to the holding pens.

Transport from Reef to Keramba

Release into Keramba

Luxuriant growth in Keramba

Figure 41 - Post Harvest Handling and Holding in Bone Baru

Once caught, fish are held in ***keramba*** or floating nets, as shown in Figure 41 and seemingly given very little attention. Fishermen said it was not necessary to provide food. Many ***keramba*** were overgrown with algae and some even had diadema urchins and other sessile (such as bivalve and

gastropod molluscs) and mobile (such as crabs) organisms dwelling within them. These communities may provide a limited food source, especially when the ***keramba*** are not occupied by a large number of fish.

Some ***keramba*** were visibly overcrowded and dead fish were observed in significant numbers in the bottom of the pens. The FGD revealed that when held over-long fish can loose condition or reduce in size. According to the fishermen met while unloading their catch into the ***keramba***, they aim to catch fish less than 4 days before the arrival, as after this mortality rises.

Monsongan

Sorting of fish rarely takes place immediately on capture, with all or almost all fish caught being taken back to the village. On transfer to holding pens there is some sorting, "rejects" (small or damaged fish) are released into the ponds between the houses where the holding nets are placed, where they seem to live and even reproduce quite happily (Appendix 7 and 17). After buyer visits, rejected fish are sometimes returned to the pen to await another buyer, sometimes released into the ponds or in the open waterways between the houses.

BCF Keramba

BCF Holding Pond with Bubu

Held BCF Recapture with Cang

Figure 42 - Holding and recapture of BCF in Monsongan

Once caught, fish are held in ***keramba*** or floating nets, or released into ponds formed by the paths between the houses, as shown in Figure 42. Males with eggs in mouth are left in the pond. Fish released into the ponds are re-caught using the ***cang***, as and when there is buyer demand.

Fish are often captured or recaptured in specific numbers when a buyer comes to order and placed ready for easy access (for sorting and packing) in a ***bubu***, a type of small floating fish cage shaped like a truncated rugby ball, which is also used in the life reef food fishery for bringing live fish (caught by cyanide, hook and line or traps, also called ***bubu***, placed on the seabed) back to (larger) ***keramba***, which can be floating, fixed to the seabed, or placed under traditional Bajo stilt houses.

Fish being held either in ***keramba*** or the ponds are seemingly given very little attention. Fishermen said it was not necessary to provide food. Some ***keramba*** were overgrown with algae and the ponds had seagrass, diadema urchins and other sessile (such as bivalve and gastropod molluscs) and mobile (such as crabs) organisms dwelling within them.

Indeed the ponds provide a fairly similar environment to that found on the shallow reef where the BCF are caught and probably provide an adequate food source. In the pond in Figure 42, the owner Pak Guhuddeng says that the fish, especially the BCF, reproduce quite well.

Tolokibit

In Tolokibit, only fish over the size of the ring finger nail (body, without tail) are caught. Any damaged or with eggs are released at the capture site. Only those fit for sale are taken back to the ***keramba***. If fish are in the ***keramba*** for over two weeks, Pak Basrun feeds them on boiled fish which he shreds into very small pieces. In Appendix 7 there is a videoclip showing Paj Basrun's ***keramba***, at the time very (over) full of fish which had been ordered but not collected. Most were still fine, but some were looking weak and a few were dead on the bottom in spite of feeding. Because of the crowding the dead fish, as in the Bone Baru photos and video clips, do not show up. The fish in the keramba are shown in Figure 43. Pak Basrun says he taught the Toropot fishermen similar methods of post-harvest care, including feeding.

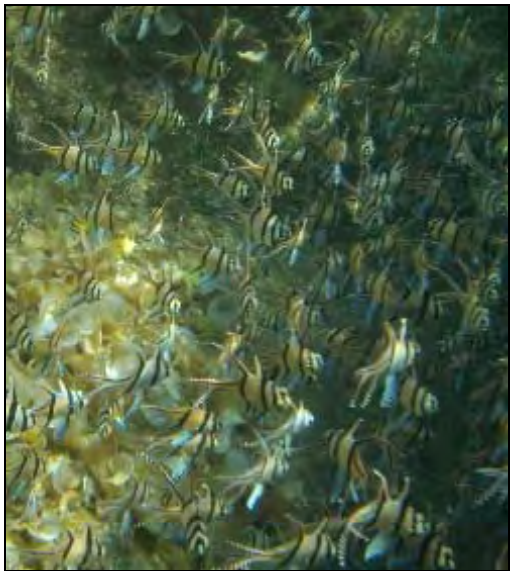


Figure 43 - BCF in Tolokibit Keramba

Panapat

Previously the Village Head Pak Rahman had a number of ***keramba*** pens, but he has not operated them since the illness of his daughter already mentioned. When they were in operation, the fish were fed on chopped trash fish. Nowadays the fish are caught and straightaway packed on board the buyer boat.

An interesting point made by Pak Rahman is that the type of nets used by other OFC (***cang*** and ***bundre***) are made of coarse netting and therefore damage the fish, leading to high buyer rejection and mortality. He is most vehement that it is vital to only used the finest of net types (similar to net curtains or mosquito netting) and avoid any other rough or sharp materials in both capture and post-harvest handling to avoid damaging the fish.

Toropot and Tinakin Laut

In Toropot fish are mostly caught to order but are also stored in ***keramba,*** mostly below the fishermen's houses. No photos of this type of holding in Toropot are available, but the pens are similar to those used in Tinakin Laut for many kinds of fish, and Figure 44 shows the Tinakin Laut Village Head with the pen he owns, where BCF are still stored, even though there is no longer any trade, he says for breeding purposes, and fed on finely chopped trash fish.

Figure 44 - BCF Keramba Below Bajo House

3.5.3.2. Packing & Transport

Packing was only witnessed at Bone Baru, both on the Tumbak boat KM Nurul Bahari (demonstration) and in preparation for shipping on KM Sinabung (actual OFT activity). Shipping on KM Sinabung was also witnessed and recorded. The procedures followed are shown in greater detail in Appendix 7 and Appendix 15. However packing is shown Figure 45. Transport can be seen in Figures 34 and 35 as well as in Appendix 15.

Sorting of fish takes place again at the buying/packing stage. Fish around 3cm SL are preferred. In highly fished areas such as Bone Baru there is a noticeable "size gap" in the "wild" populations, with mainly very small and very large fish visible. Fish in excess of 6 or 6.5cm SL ("super") are rarely accepted by buyers, as are fish under 2.5 SL. The reason given is high mortality in transit, confirmed by the team's limited experience (see Appendix 8). Any rejected fish which are very weak or damaged are generally released just off the beach, where they may or may not be able to find their way safely to suitable habitat. Others, especially small fish, are often returned to the pens until another buyer comes. Most likely as a result of this, there are quite a few fish living just in front of the village, including below the pens, in the branching corals and sea-urchins found there which are after all their natural habitat.

Fishermen or wives bring fish

Bags are filled with treated water

Selected fish are added

The bags are filled with oxygen

Packing on Nurul Bahari

Fish are stacked in the hold like this

Figure 45 - Packing BCF in Bone Baru

Very tight control/sorting is carried out by the ***sortir*** (person entrusted with fish selection) when the buyer visits. The ***sortir*** is a respected expert, whose word on the acceptance or rejection of a fish is final. Any damaged or diseased fish are rejected out of hand, otherwise size, colour and even just "feeling" (possibly based on experience as to likelihood of survival using criteria which are subconscious and/or can't be put into words) play a role.

The special packing equipment is not available locally, and is brought in by the buyers only at packing time, then taken away again. Sorted fish are placed in special double-walled plastic bags, filled with a mixture of seawater and a special ***obat*** (Indonesian for medicine). For the Sinabung route, the ***obat*** is a chemical which is brought by the KM Sinabung buyers in 11/2 litre water bottles, and is a closely guarded secret, although it is said to be ***masak*** or cooked to prepare it. Before mixing with seawater, this ***obat*** is viscous and almost black, however the treated seawater is slightly yellow, as can be seen in the pictures.

The "obat" used for the fish packing by Tumbak buyers on Nurul Bahari was shown. It is a patent fish medicine sold in small sachets at 15,000Rp per sachet, and is an antibacterial/antifungal agent for preventing/curing fish infections and promoting wound healing. The packet wrapping stated it was an aquarium fish remedy and gave instructions in English, which the crew cannot read. One packet can be diluted for many bags, though the crew could not give an exact figure. The powder is off-white and also colours the water yellow as can be seen in Figure 39.As an antibiotic it would

also have soporific effects, which would explain the relative "slow motion" observed by the team in BCF packed using this medium.

According to both the buyers and local fishers, the ***obat*** and oxygen together are the secret of reduced mortality. Without either one, mortality rises dramatically. From the effect of the ***obat*** on fish bought and transported by the team, it would seem that the ***obat*** probably in some way slows the fishes metabolism temporarily.

Only the buyers team can handle the fish after sorting, and they carry out the packing process. Around 30 to 35 fish are placed in each bag - counted by the ***sortir.*** The Local fishermen suspect there is often undercounting of fish at this stage. The bags are filled with oxygen and tightly sealed with rubber bands. The KM Sinabung consignments generally consist of a number of styrofoam boxes which take up to 12 bags. Packing density is similar for both KM Sinabung and Tumbak boat routes from Bone Baru. Based on key informants and FGD output, packing procedures are similar everywhere. The main variations are in size of bags used and density of packing. A resume of these figures is given in Table 20 below.

En-route to Tumbak, the main duty of the sailors is the care of the cargo (the fish), especially regular changing of water and refilling bags with oxygen (every 10 hours in 1999). The round trip would usually take 10 days. According to the FGD, on each return trip the Tumbak boats would carry about 200 -300 bags of fish, each with around 30-35 fish, half-filled with sea-water, half with oxygen. This gives a total of around 7,000 – 10,000 fish.

The oxygen tanks onboard KN Nurul Bahari are still the original two donated by IMA in the 1990s and seen on the visit to Tumbak in 1999. They had already started to corrode then, and are now in what appears to be a potentially dangerous condition, see Figure 46. The oxygen valve (tap) is also original (Appendix 7) and seems in good condition. The regulator though which oxygen is delivered is removed (with adjustable spanner) between uses. These two tanks are sufficient for one trip to Bangkep until arrival in Tumbak where fish are released into ***keramba***.

Figure 46 - Corroded Oxygen Tanks (donated by IMA in 1990s) on KM Nurul Bahari

Oxygen is added every 10-12 hours for BCF, but every 6 hours or less for napoleon wrasse and letter six, which are both difficult to keep alive long according to the crew. BCF are more profitable than Letter six, in spite of the lower price and price differential, because only around 10% die, whereas often more than 60% Letter six die. The crew only bother with the more finicky fish because the buyers are reluctant to take BCF unless there are other species too.

3.5.3.3. Higher market levels

Tumbak

Conditions of holding in Tumbak were described by the crew of KM Nurul Bahari. In 1999 there were several ***keramba*** below the houses of wealthier Tumbak residents (Moore 1999), and this is still the case according to the Tumbak crew. At the time, these holding pens were used for napoleon wrasse *Cheilinus undulatus* of food-fish size ,as well as ornamental fish, which the owners proudly declared would be exported easily as "angel biasa" - ordinary angel fish (Moore 1999), and is apparently still the case, including for juveniles sold in the OFT.

The fish are usually held for several few days before a buyer comes from Manado. If kept for some time, BCF, Napoleon wrasse, baramundi cod and other carnivorous fish are fed on chopped

fish, usually after about 2 weeks as then they "***jadi kurus***" - become thin. Letter six and other herbivorous fish are fed on chopped chinese cabbage, which the crew say they really like.

Apparently BCF rejected by the buyers have been released in Tumbak, and are now forming colonies which are being exploited by some fishers who used to come to the Banggai. This is another reason for the decline in traders visiting Bone Baru and the Banggai Islands generally.

Manado & Bali:

Conditions in Manado are unknown but are probably similar to those in Bali. The facilities at a major buyer/exporter in Bali, CV Dinar were seen and data gathered from employees during the Planning Meeting training by Abigail Moore and Samliok Ndobe, who were able to gain entrance to the fish holding area, and this data is given below. A few pictures are shown in Figure 47 (the picture on the right was taken by Elisabeth Gonzales of STREAM Philippines).

Product arrives in large batches, 100s to 1000s. Often in poor condition, needing care and time to recover. From Java by road, bumps a problem, so have to go slow. Also by air and sea, but little info. Some supplies come from collectors who are directly part of CV Dinar operation (Mainly in Sulawesi, Bali & E Java), others are from independent suppliers (eg in Irian Jaya, and N. Sumatra). Many fish are caught on spec, not yet ordered, so sometimes have overstocking problems resulting in being forced to sell cheap. Careful record-keeping was observed in fish area, which is officially off-limits to visitors.

Outdoor Aquariums

Fish Holding Facility

Invertebrate Aquarium Maintenance

Figure 47 - CV Dinar, a Buyer/Exporter in Bali receiving BCF and other fish from Bangkep

Origins of the stock at CV Dinar include Sulawesi (agents/cabang CV Dinar in Kendari, Palu, Makassar, Manado come from almost all islands), Irian Jaya, Java and Bali. Different fish from different areas. Chain of custody for Sulawesi: to Palu or Kendari, then Makassar or Manado then Bali. Over 1000 Banggai Cardinalfish were seen in the tanks, with lmore just arrived in acclimation. Some unusual fish species seen apparently come from Bali only, so possibly endemic? Blue tang is usually from Medan. Small threadfin grouper (2-5cm) seen apparently mainly come from or via Palu, unusual wrasse from Kendari.

Other fish species and Families seen in the facility included Serranidae, Chaetodontidae, Labridae, Haemulidae, Scaridae, Pomacentridae, Surgeon fish & tangs, Jacks & Trevallys, damsel fish and similar (many types, large numbers), snappers, anemone fish (unusual one only from Irian Jaya), sharks, rays, shark eggs, blennies and many types of hole dwelling fish, lizard fish, cleaner shrimps, baby lobster, several cardinal fish, puffer fish, box fish, porcupine fish, cow fish, cleaner wrasse, Moorish idols and banner fish, bat fish incl. Bali special (gold with brown spots, no stripe), stone fish (big ones, many colours), lion fish (several types), trigger fish, and pipefish and seahorse species.

Many invertebrates were kept often in large numbers, including sand-living worms, soft corals, hard corals (cataphylia, euphylia ancora, many others), anemones (especially many and varied small ones), zoanthids (many), coelenterates, long blue eel-like fish (Bali), tridacna clams (told these are cultured), shellfish (gastropods) including what looked like small trochus (a protected

species), hermit crabs, diadema and tripneustes sea urchins, starfish (orange, blue, green, many unusual ones), also “living rock” which is a technical term for dead coral with encrusting organisms, algae (Halimeda, other calcareous algae), etc

Acclimation is carried out on arrival. Each fish arrives in an individual container with holes in it and is placed in water at same temperature and composition as in tanks, to avoid temperature or chemical shock from sudden change. On arrival many fish very weak and look almost dead. Most recover according to operators of tank area. Length of stay in holding facility usually 3-7 days, sometimes longer. Water constantly circulating, changed every day. Some fish which can be aggressive have to be kept in individual containers/tanks for all their stay.

UV is widely used. No information was obtained on pre-system filtering, but in-situ filtering uses coral rubble and sand, possibly other also. Cleaning of tanks is an ongoing task. Knowledge level of staff relatively high, also seemed to enjoy their job and talking about it, but only open up to a point. Most usual feed is rebon = small shrimps (mycid), artificial feed, trash fish, possibly others. Most invertebrates not fed, only have frequent water change.

International destinations include many European Countries, especially France, with Eastern Europe included, eg Chekoslovakia consignment about to leave, including Banggai cardinal fish, angel & Butterfly fish, etc, at the time of the visit. Sharks mostly sold in Asia, unusual request, but kept ready, as profitable.

There is also a local market includes providing a complete service: an aquarium with all fish and inverts, water changing and cleaning on a weekly basis, mortality replacements (each species has a guaranteed life, for angel fish only 3 months) – all for a fixed monthly payment. This is available in Bali, Jakarta and Makassar. The company is keen to look for new opportunities or markets.

Packing in crucial, as if poorly packed many fish and invertebrates may be damaged and die. Each individual is packed separately, Invertebrates are plastic wrapped (clear plastic bags are slit, rinsed in fresh and then salt water before use by a young female worker) before being put in plastic bag. Oxygen used for fish and inverts. Temperature is often critical for particular species of fish and even more so invertebrates.

Methods of payment to supplier: next day after delivery arrives, after screening. On export, the company receives a down-payment first, then full payment after screening at destination. CV Dinar sell all equipment as well as using it.

The company does not care about mode of capture, e.g. using cyanide or not, according to the informants. Fish from different areas kept in separate tanks. Maybe because the company is already aware of specific risks e.g. cyanide mortality, or to ensure that mortality losses are attributed to the right supplier. The Screener will decide on price, which can depend on perceived likelihood of or obvious symptoms of damage.

The current Permit system is felt to be too complicated, so the company feels they have to find short-cuts. The informants feel there is a lack of political will to improve the system and regulate effectively or fairly. The system is weighted to favour big guys, bigger than CV Dinar. However, we were told that even small-scale exporters have their own market, so still survive. CV Dinar has been trading over 20 years, so has many long-term partners.

CV Dinar has contracts with the Hasanuddin University (UNHAS) in Makassar and Institut Pertanian Bogor (IPB) in Bogor for new products, e.g. giant clam breeding, coral transplantation, etc. The company has also started some rehabilitation activities in a particular area, though no details were given.

3.6. Livelihoods Analyses

The data and information below are almost entirely from field data. The presentations in Appendix 2 give additional mainly visual data on specific aspects. As the main group of poor stakeholders identified was the OFC themselves, most information relates to and/or focuses on this group. However there is some limited information on the Tumbak buyer boat crew who also arguably count as poor people involved in the trade. A detailed interview with the family of Pak Guhudeng, a Monsongan OFC, is given in Appendix 11, which illustrates many of the main aspects of OFC family livelihoods.

3.6.1. Economic and Financial

Some economic data has already been included in the village profiles, however specific livelihood-relevant aspects are included in this section, related to the OFT and to other livelihood activities of OFC, their immediate families and also to some extent extended families - as wider family ties are still very strong in the Bangkep area.

3.6.1.1. Trends in the ornamental fish trade including seasonality and major events

Seasonality was an issue for most local people involved in the ornamental fish trade. Factors influencing seasonal levels of activity in the ornamental fish trade included climatic variations (especially related to the main monsoon seasons), other activities (eg grouper spawning periods, farming seasons) but the main factor was market demand - fluctuations in demand/frequency of visits from buyers, themselves influenced by demand or lack of it from higher up the chain.

Major events in the Archipelago include the declaration of Banggai Kepulauan as independent Regency in 1999, the earthquake in 2000, with different impact levels in different locations (near/far from the epicentre). Specific ornamental fish related changes include the start of the trade (1980s to around 2000 depending on areas) and the commencing of the KM Sinabung operations in January 2004. More specific information for some villages is given below.

Bone Baru:

Seasonal factors:

Ornamental fishing takes place at all times of year. Though locations and frequency do very with the seasons, market demand is the main factor influencing the level of OF activity, as there are always some accessible fishing grounds.

Table 20 - Seasonal Calendar for Bone Baru

January to March + March to June	June to Sept/Oct	October to December
Drought, hard times for farmers and fisher/farmers	Clove season, many people work on plantations	Squid season, many people work on squid boats, drying, etc
December - February: (Tumbak buyers) best OF market, if can make journey	OFC continues depending on buyers	
January to March strong N winds, hard to go to sea	Winds rarely prevent fishing or transportation	
Vanilla needs watering, water tanks often dry up	Usually some rain December can also be very dry (as on this visit)	

Although reluctant to undertake strenuous work during the fasting month of Ramadhan, if the buyers come they will fish. If not, they will undertake other activities. Main activities from the FGD seasonal calendar, together with data from KI interviews are shown in Table 20.

During the ***Musim Utara*** (North Monsoon), which begins in December and lasts until February or April, collection of letter six increases, while BCF is mainly caught during the ***Musim Selatan*** (South Monsoon). The most difficult and dangerous weather (North Monsoon) corresponds with the highest market peak in January/February.

Historical Events and Major Changes

Major events and changes are shown in Table 21. The major traumatic event remembered by everyone was the earthquake which occurred in 2000, whose epicentre was very close to Bone Baru. Cracks appeared in the ground, and water came up out of the cracks, which was hot and carried shells, sand and other sea substrate and creatures. The spurting water reached a height of up to 3 metres. All houses and other buildings were destroyed and psychological trauma was felt for many months afterwards. For one week after the event no-one went fishing or farming. Indeed many are still afraid of another earthquake. Substantial aid was given in kind and in cash, including clothes, food, materials etc.

There was help in kind for rebuilding, which was given to each family head, and consisted of cement, plywood, nails and other building materials. Many people added to this from their own resources, mainly income from cloves or squid. As a result, many houses have been rebuilt better than before, with what is termed "semi-permanent" construction, which means partly cement-based (using coral rock foundations then bricks, concrete blocks, shuttered concrete etc for the walls etc), usually the foundation and lower walls, and partly timber, usually the upper walls and roof frames. Roofs are mostly of "seng", galvanised corrugated iron, but sometimes of the traditional ***atap***, roofing sheets made from nipa palm (a mangrove forest species) or other palm leaves (Appendix 2, A2.2). The Village Hall (Balai Desa) was rebuilt with help from the army under a programme called "Abri masuk Desa" - Army goes to the Village.

The previous Village Head did not have a good relationship with other village officers (especially the Sekdes or Village Secretary, the number two official). It was said he only cared about himself. In addition he felt ashamed if it was said that there were any poor people in Bone Baru, so that many possible Government programmes were rejected. This is one reason the village has been late in acquiring much infrastructure, and that there is not yet a good road access, with the tarmac stopping at the village boundary.

The start of the KM Sinabung line and reduction in buyer demand (frequency and quantity) for ornamental fish have also been major changes since the start of OF in 1993.

Table 21 - Major Recent Events in Bone Baru

Event	Year/When	Effect
OFC started	1993	Additional Opportunity
Earthquake and Tsunami	2000	Physical Destruction Economic Disruption Trauma
Change of Village Head	Recent, 2003	Positive change in policy Start of development: education, water supply etc Health cards for poor and old
M. V. Sinabung route opened to Bitung	January 2004	Partial Change in OFT Route
Reduction in demand for ornamental fish	2002 - 2004	Loss of/less interest in OF especially among young people

According to the crew of Tumbak boat KM Nurul Bahari, there were indeed 10 OFT boats operating from Tumbak in 2001/2002, but since 2002 the trade has diminished, and now they are the only boat still operating regularly. Apparently they were also the first in Tumbak to take up the OFT and have no intentions of changing as long as they can still make a living. They say

they enjoy their work, and this is as important as the size of the financial rewards, so long as basic needs are met.

The other Tumbak boats which have been involved in OFT are now dealing in salt dried fish (***ikan asin***) which is currently in high demand, and has higher profit margins than ornamental fish trading. They would return to the OFT if the rewards were as good as or better than for ***ikan asin***. This increase in ***ikan asin*** is a worrying development as almost all fishing for the production of ***ikan asin*** is carried out using explosives - bomb fishing. Proyek Pesisir was supposed to have eradicated destructive fishing (DF) in the target villages including Tumbak. It would seem that as in 1999, the main thing still is not to do or encourage DF near to home...

Monsongan:

Seasonal factors

A seasonal calendar was drawn up showing major seasons and livelihood activities over the year, and is shown in Table 22. Note that OFC shows no great variation over the seasons except for during Ramadhan, the fasting month, and during the following festivities surrounding Idul Fitri or Lebaran, when non-subsistence fishing activity is greatly reduced. The main factor is buyer demand. However as Ramadhan changes dates every year, it is hard to place on a Gregorian calendar. Ramadhan is shown here for 2004, where Ramadhan began on 14th October, and Idul Fitri was on the 14th of November. Each year it will change by a lunar month.

Seasons: ***Musim Utara*** Jan-March; ***Tenggara*** April-July - only time strong winds+ big waves (ombak putih - white horses) except inshore, winds strong from direction of main food fish fishing grounds (Bokan & Bangkurung), so hard times for fishermen; ***Barat*** Aug/Sept, ***Selatan*** Oct-Dec, so both visits during this season, which is generally calm and conducive to fishing. OF is not much affected as nearby nearshore waters where most OF is carried are usually quite sheltered and accessible throughout the year. Having a market (buyer demand) is the most important factor in OF.

The new school year starts in June, just at the end of the difficult ***Tenggara*** season. This is one reason fisher family children often dropout of school.

Table 22 - Seasonal Calendar for Monsongan

Activity/Season	O	N	D	J	F	M	A	M	J	J	A	S
OFC	Low		Regular - For Collection Every 2 Weeks									
Food Fish & Invertebrates	Consump-tion		For Consumption and For Sale									
Ramadhan 2004 (grey) and Start of School Year (SY)									SY			
Winds/Season	Selatan S Calm Good Fishing		Utara N				Tenggara SE Strong winds White horses				Barat W	
Precipitation		Wet Season				Variable				Dry Season		

Historical Events and Major Changes

Major events are shown in Table 23. The earthquake which occurred in 2000 seems to have affected the underwater environment to some extent, as well as the human population. However, unlike Bone Baru, the Monsongan FGD did not focus on this natural disaster, which it seems was not very destructive unlike in Bone Baru where everything was razed to the ground. Only 20 Bajo houses fell apart and were rebuilt (no nails used, just slotted together, tsunami wave of only 1m caused them to come apart). A few kitchen extensions and one or maybe 2 houses on land fell down. No one died.

However the large-scale seaweed project (***dana bergulir***, or rotating loan), for which the pilot project had been very successful, failed because all the seaweed died after the event - maybe partly from mechanical damage, possibly also from chemicals in the water, as the tsunami was from water sucked under the earth's crust then spat forth again. The aid was all food, no compensation or replacement of the lost seaweed production. So, with the capital gone, the people gave up, and seaweed production on any scale has not been attempted again since then.

Road to the plantation/farming area is around 4km long, before it was built everything was carried on people's shoulders; Then once there was the road, people had horses to carry produce. However about 80 out of 200+ million rupiah was misappropriated and the road was not properly finished. Flooding soon damaged it beyond the means of the village to repair, so people have had to go back to carrying all produce out on foot.

The other major changes seem to be the opening of the PELNI route (KM Sinabung) to Bitung and the cessation of local financier/collector operations, which have changed the structure of the market chain considerably, as is seen in Figures 36 & 37.

Table 23 - Major Recent Events in Monsongan

Event	Year/When	Effect
OFC started	1995	Additional Opportunity
Earthquake and Tsunami	2000	Minor Physical Destruction Economy/supplies disrupted, short-term Seaweed Farming project failed
Cessation of local Collector/Financier activities	Seems to have occurred during 2004	Increased dependence on other credit sources including Tumbak buyers and loan sharks
M. V. Sinabung route opened to Bitung	January 2004	Major change in OFC trade route, no more boat to Tumbak
Reduction in demand for OF	2002 - 2004	Fewer fishers regularly undertake OFC

Panapat:

Seasonal Factors:

A seasonal calendar was drawn up, showing major livelihood activities over the year, and the results are shown in Table 24. It became clear that the end of the year is a very "busy" period, when several activities were at a peak and there are other times when very little opportunities were available. During these times many people leave the village to seek work. Some end up going away for years rather than months, even abroad as legal or illegal foreign workers, mainly in Malaysia but also in other countries. The level of OF varies with weather more because this affects the arrival or not of buyer/fisher boats from Bali than because of problems with fishing locally. If there was demand ornamental fish collecting could be carried out more regularly.

Table 24 - Seasonal Calendar for Panapat

Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Level of OF	Low		High			None Bad Weather			High			Low
Winds	North winds		West Winds			East Winds			Calm weather			N
Other Activ-ities								**Grouper Fishing**				
							Clove harvesting					
	Dry Season						**Farming Season**					

One seasonal fishing activity other than OFC which has been going on for "hundreds of years" (FGD members), is the exploitation of grouper spawning aggregations, the approximate locations of which were shown to the team on the map (Figure 1). It seems that these aggregations have

decreased markedly, there are around 10 times fewer fish now (hundreds of fish) than in the 1970s (thousands of fish) according to one informant who has been fishing these aggregations since he was a child, and his father before him. These grouper are caught using rod and line and sold live to Banggai then Hongkong. In one day a fisherman may catch as many as 10 fish. Previously the activity was dominated by an Indian trader. However since this trader moved away, the fishers do not have a good regular contact, and although they still fish are less satisfied with the returns.

Historical Events and Major Changes

Apart from the start of the OFT in 1996 or 1997, no major events were mentioned. The 2000 earthquake had little effect other than temporary disruption of some supplies and services.

Tolokibit:

The village has grown in the last 25 years, before that it was mainly plantations where people only came to work on them/harvest then went home, with a few fishers living near the shore. A detailed seasonal calendar was drawn up and is shown in Table 25.

Table 25 - Seasonal Calendar for Tolokibit

<table>
<tr><th>Jan-March</th><th>April - June</th><th>June/July</th><th>Sept - Dec</th></tr>
<tr><td>North (Utara)</td><td>North still or change to SE (Tenggara) or S</td><td>West or mixed</td><td>South, sometimes mixed at the end</td></tr>
<tr><td>Dry, hot</td><td>If North still dry
If SE or S, rains, good</td><td>Sometimes rain, especially if mixed, sometimes dry</td><td>Usually dry
Sometimes rain if mixed at the end</td></tr>
<tr><td>Big waves, hard to go to sea, Ok inshore (BCF for ex)</td><td colspan="2">Usually good conditions at sea for fishing</td><td>Sometimes have East wind from Nov-Jan</td></tr>
<tr><td>Good for seaweed farming (best time)</td><td></td><td>Good for seaweed farming (often May-Sept)</td><td>Main Squid season (around full moon)</td></tr>
<tr><td colspan="4">OFC can take place inshore anytime, depending on buyer requirements</td></tr>
<tr><td colspan="2">Many rely on root crops and Sagu to survive until the rains come, then plant/tend crops</td><td>Good for farming if not too dry, clove harvest</td><td>Dec/Jan harvest time for cashew & some fruit (mango)</td></tr>
</table>

December is often a good month, with some rain at the changeover. But if the South winds run straight into the North wind season, the drought months can be uninterrupted for 6 - 9 months, and life becomes very hard.

Seaweed farming needs good water movement, so the rougher weather which curtails other activities favours it.

Squid are caught around the full moon, when almost all the Dusun goes to sea, often 8 or more per boat, mainly around Kenau Island. They are sold dried.

The water supply is week, not enough for needs especially in the dry season. Some people make provision for the dry months, but these are mainly farmers. Very few if any fishers do so. Usually what tides people over is the ***sagu*** (sago, a swamp tree)**,** and cassava (ubi kayu) which still survive in the drought season unlike the endemic "ubi banggai" and most other food crops. The fishermen are "***pasrah***" - resigned - to hardship in the dry season.

3.6.1.2. Financial aspects

Bone Baru

Income from Ornamental Fish Collection

In the past, one collecting fisherman could catch (and sell) between 5,000 and 10,000 fish during one buyer visit. Even at the lowest price ever reported (IDR 50), this would have been a good income of 1 to two million Rupiah per month, well in excess of the official monthly salary of many civil servants and of most wage earners, and at better prices of around IDR 250 would have yielded 5 to 10 million a month, a very high figure.

Now, average catch is 1,000-2,000 per week, which if all was sold at the current price (since 2002) would yield IDR 1.2 to IDR 1.44 Million per month, still a goodly income, as costs are relatively low. However, on the buyer visit witnessed by the team, only 250 fish per fishermen were accepted, making a total of IDR 75,000 income for that trip, and if repeated weekly, only IDR 300,000 per month. Bearing in mind that these are gross, not net, incomes, and IDR 300,000 is at best only a supplement to basic livelihood requirements. Real incomes are likely to fall between these figures. More information on the financial viability of OFC is given in Appendix 9. According to the FGD, income from OFC is now mainly used for education, to supplement diet - for example milk for the children, and for health care rather than for basics such as rice. However at the peak it was the main income for a number of families.

Income from Ornamental Fish Trading

According to the Bone Baru fishermen, for Tumbak buyer boat crew members, the net profits from the voyage are shared equally among the crew, so that if there were, say 7 crew members (the average crew complement according to the FGD), the profit would be split into 7 equal portions.

Although this is second-hand information, it is compatible with the information given in Tumbak in 1999 (Moore 1999) where the system of profit-sharing was as follows: 50% after deduction of costs to the vessels owner, and 50% (probably the net profit referred to in Bone Baru) shared among the crew members.

KM Nurul Bahari had 5 crew plus 2 passengers en-route to visit family in Toropot. The profit sharing was indeed as in 1999. The actual figures (net of all deductions other than debts) are around IDR 200,000 on a poor trip to IDR 500,000 on a good trip per crew member. One to three trips per month are usually made, depending on weather and market demand.

Financing

From informal conversations, it seems the financing situation has changed in a way similar to that in Monsongan, in that previous local buyer/financiers have pulled out. Although income per fish has risen, in many ways life is harder, for example now only very small levels of credit can be had for buying basic items from the ***kios***, as there is no longer any security (rights over the catch) for the ***kios*** owner. Now the services of ***rentenir*** (loan sharks) are used more often. Often the only way to pay these off , i.e. to get a big lump sum, is by destructive fishing (DF), especially the use of explosives. So DF and debt are intimately linked. Most fishing families are never out of debt, or only for a few days according to ***kios*** owners, however the fishermen did not mention this aspect.

The KM Nurul Bahari crew, like the OFC in Bone Baru, are virtually never out of debt, so they are very dependant on the boat owner, their "big boss" - that is the actual expression they used during the Bone Baru interview, a sign of western/modern influence. In 1999 the term for the boat owner and expedition financier was ***Punggawa***, while the crew were termed ***Sawi,*** common terms in Sulawesi for a long-standing feudal-type relationship developed over hundreds of years

and which is still very relevant today. As under the feudal system, the advantages are not all one way. Although the "overlord" and his family generally enjoy a much higher lifestyle than the retainers, the latter enjoy a measure of security hard to find in a society with little or no social security "safety net", and good ***Punggawa*** bosses take care of their ***Sawi*** retainers when sick or otherwise in dire need, often reaping in return a high loyalty. This seemed to be the case for the KM Nurul Bahari crew, and one reason for their continued involvement in the OFT.

Monsongan

The price is currently supposedly fixed at 300Rp per fish. Recent and current prices, along with some indication of prices in Manado and Bali were available, for CBF, which is by far the major OF species caught and traded in Monsongan. This information is shown in Table 26 below.

Table 26 – Prices Received along Tumbak Trading route for BCF in IDR.

	Monsongan Fishermen	Monsongan Local Collector (2)	Tumbak Buyers from Manado/Bitung	Manado Buyers From Bali Exporter
Now via KM Sinabung	300	No longer ?	1,000- 1,250	3,000 – 6,000
Until early 2004 Tumbak boats	200-250	300-350	1,000- 1,250	3,000 – 6,000

The difference between prices in Monsongan from the Tumbak buyers and that received in Tumbak/Manado by the Tumbak buyers from the Manado Buyers is apparently partly due to mortality, as well as to the costs of transport etc.

Mortality was said to be around 10% during transport to Manado using KM Sinabung, no indication of mortality previously when Tumbak buyers came in their own boats, or further up the chain. In 1999 (Moore 1999) mortality for transport of ornamental fish from Banggai to Tumbak was generally in excess of 50%, sometimes as high as 80%. Based on information from Bone Baru it would seem that there has been some reduction in mortality levels since then.

Based on a demand reduced to only 7,000 to 10,000 per fortnight, income would be IDR 4,200,000 to IDR 6,000,000 which if split evenly between the 15 OFC families would be around IDR 280,000 to IDR 400,000 per family per month from BCF, with some additional income when other species are caught and sold. This is comparable to the average income of the women fish sellers (about 10,000 per day or 300,000 per month). At these income levels, a family with two incomes (from OF and food fish selling) could just about cover basic needs, but even the slightest unexpected expense could tip the balance into the spiral of debt, with increasing poverty and dependence. If the family had a third or fourth income, as some do, then they could start to afford decent clothing, education above the basic primary level, etc.

There are no longer any local intermediary buyer/financiers, as the people who used to run these businesses (two) found it no longer profitable, mainly they said because of low margins/volumes compared to the risk - of mortality and of fishers not keeping their promises - e.g. selling directly to other buyers after borrowing from them.

Panapat

According to the FGD, at the height of the trade around 2002, one collecting fisherman could catch (and sell) between 1,000 and 5,000 fish during one buyer visit. This would have resulted in an income of between IDR 300,000 and IDR 1,500,000 per fisherman every few weeks. This is equivalent to the official monthly salary of many civil servants. Now, average catches/sales are less, and the average per fisherman is around 500 fish, giving an income per trip of only around 150,000Rp, not enough to live on even for a single person, but enough to be a worthwhile extra if not too much time is spent acquiring it.

Tolokibit

The usual price for BCF is IDR 300 as in other villages. When a buyer comes, the group share the quota evenly - all who want to sell get an equal share even the Sekdes, when the buyer comes. The main problem is the irregularity of buyer visits.

3.6.2. Natural Resources

While detailed information per village has been given in the data on collection (Chapter 5) and BCF population data is given in more detail in the biophysical survey report in Appendix 3, a general overview of the resource base is given for the area as a whole.

3.6.2.1. Collection sites

Known harvesting areas are shown in Figure 20, but anecdotal information from a number of people met during the study and secondary data indicate that these are far from a complete set of OF fishing grounds in the Banggai Archipelago, especially if activities by non-local OFC are included. Indeed, although by no means all villages are involved in the OFT, it seems there are few coastal areas of Bangkep where ornamental fish are not caught, either regularly or occasionally, and that any remaining unharvested areas remain so because they are not worth the effort or there is some other conflicting activity which prevents OF (as in the case of the Pearl Farm) or makes OF an unattractive or dangerous as an activity (as in Harbour areas) rather than because they are undiscovered. The main collection areas are coral reefs, both the reef flat (e.g. for BCF) and reef crest/slope (e.g. for ***letter six*** and ***piyama***). Therefore the map of coral reef areas in Bangkep in Figure 48 where the reef areas are shown in pink. Major known ornamental fishing grounds are indicated in red type.

Figure 48 - Coral Reefs and Known Ornamental Fishing Grounds

3.6.2.2. Condition of resources

Little data is available on the condition of fish stocks other than BCF (***Pterapogon kauderni***), though FGD revealed that all species targeted are harder to catch than when the trade first started. This indicates non-sustainable fishing levels.

The Substrate - Coral Reef Resources and others

Biophysical survey results are given in further detail in Appendix 3 and Chapter 5. In general the seagrass beds (habitat of some ornamental species) were seen to be in fairly good condition, and do not seem overly threatened as yet. Mangrove resources (nursery areas for some ornamental species) although not specifically studied during this survey, are under severe threat around all inhabited islands from use as firewood and are clearly far less extensive than was

once the case. General observations regarding the condition of the coral reef substrate and the BCF (***Pterapogon kauderni***) population are given here. Most ornamental fishing methods seen or reported can and often do result in considerable mechanical damage to the reef, especially where there are branching or other fragile coral life forms, such as foliose corals. It would seem that ornamental fishing is largely to blame for the high incidence of rubble and soft coral cover shown in the Bone Baru data for example, where unlike that seen in deeper water areas down the reef slope, the shallow-water reef damage was not typical of bomb fishing. The substrate condition and composition at survey sites is shown in Figure 49 and Table 27.

Table 27 - Coral Condition and Composition at BCF Sites

	Hard Coral	Soft Coral	Other	Dead Coral	Rubble	Sand/ Silt	Coverage	Condition
Monsongan Manta Tow	29%	4%	8%	9%	15%	35%	5 Tows 0.64km	40% Good 60% Poor
Monsongan Transects	45%	< 1 % (0.4%)	6%	16%	14%	18%	5 Transects	40% Good 60% Average
Bone Baru Manta Tow	11%	29%	4%	10%	21%	25%	8 Tows 1.9km	50% Poor 50% Very Poor
Bone Baru Transects	20%	14%	4%	20%	22%	20%	2 Transects	100% Poor
Pearl Farm Transects	28%	1%	17%	9%	13%	32%	3 Transects	67% Average 33% Poor

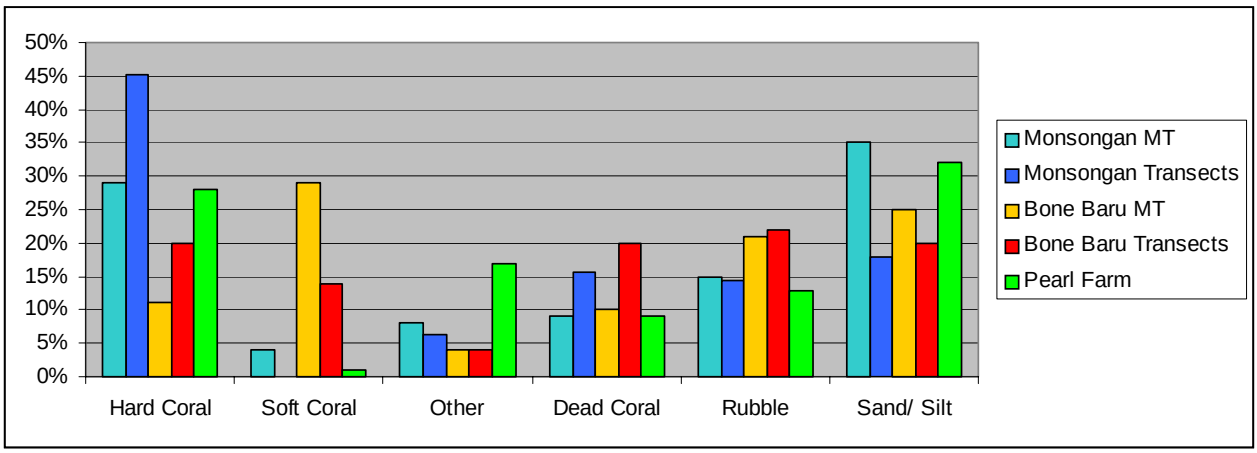


Figure 49 - Substrate Composition and Reef Condition at Survey Sites

Threats to the coral reefs of the Banggai Archipelago, the major habitat for most ornamental fish target species, are by no means limited to the effects of ornamental fishing, with or without cyanide, and the major threats identified by the field study are given in Table 28, in order (from top to bottom) of the relative contribution to coral reef degradation and destruction based on survey results, both direct observation and interviews.

Note that sedimentation and pollution are near the bottom of the list for now, but that this may well change for fringing reefs around the larger islands and near population centres with observed changes in land-use patterns and the seemingly total lack of any efforts to prevent marine pollution. Images of damage from most of these threats are shown in Figure 50. Images of the damage done through OF for BCF were given in Chapter 5 and for cyanide use in Appendix 12.

Table 28 - Major Threats to Banggai Kepulauan Coral Reefs in 2004

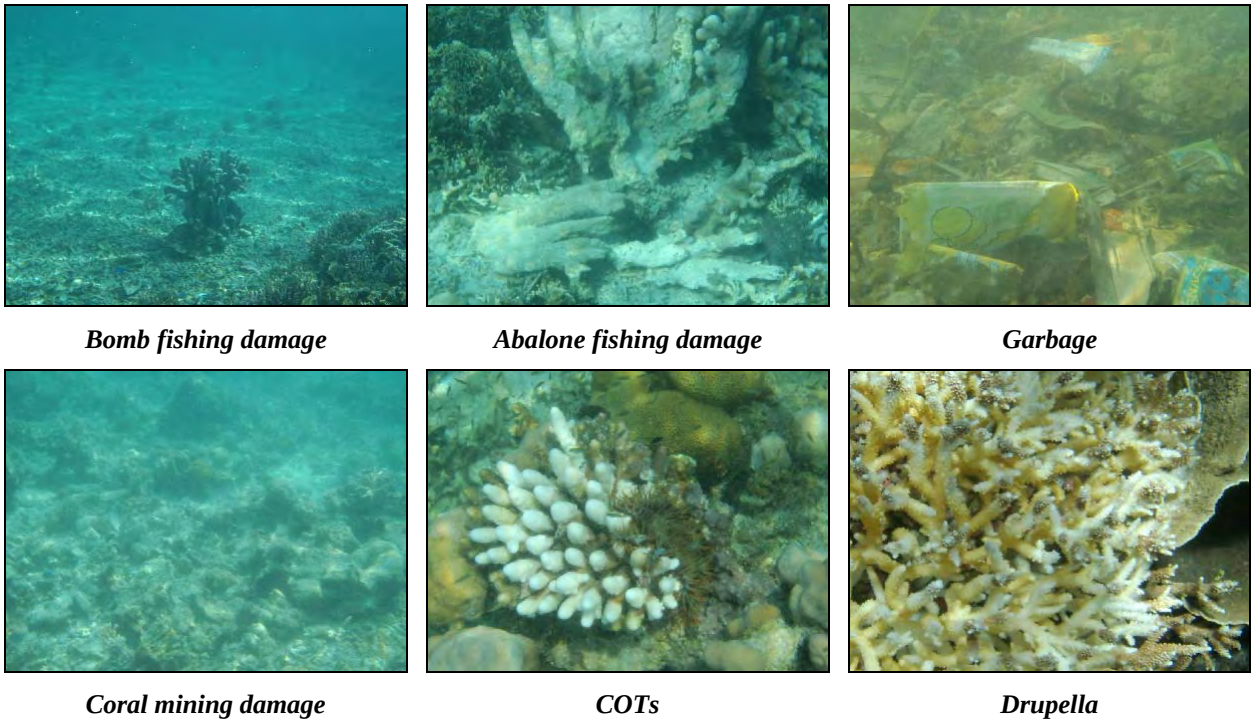
Threat Type	Perpertrators and Main Reasons	Effects and other Remarks/References
Use of explosives to catch fish (Bomb Fishing)	Fishers from within and without the archipelago Mainly for ***ikan asin***	♦ Coral structure shattered, high levels of rubble ♦ Recovery (if it occurs) may take decades or even longer
Coral mining for building	Local villagers Government projects	♦ Coastal abrasion ♦ Destroys coral ecosystem ♦ Illegal
Use of poison to catch fish (potas = potassium cyanide, used by goldsmiths and easily available)	For export: Ornamental fishers (OFC) LRFT fishers Lobster Fishers For local consumption: Fresh food fish fishers	♦ Non-target fish die ♦ Corals bleached or die ♦ Invertebrates die ♦ Plankton including juvenile fish and invertebrates die
Removal of invertebrates using crowbars and similar tools: clams (*Tridacna sp.)*, abalone, octopus, some sea-cucmber species, etc	Fishers Coastal dwelling people generally, including women and children	♦ Coral colonies destroyed ♦ Habitat of target species destroyed ♦ Clams (*Tridacna sp.*) are a protected species
Anchoring	Fishers Crews of other vessels	Coral colonies broken, usually especially when lifting the anchor
Ornamental fish collection - non cyanide, using oar or similar	Ornamental Fishers (OFC)	Coral colonies damaged, usually branches snapped off, some corals overturned
Predation by high numbers of *Acanthaster plancii* (COT - Crown of Thorns)	Possibly natural or due to overfishing of *Cheilinus undulatus* by LRFT fishers	Coral polyps digested leaving white skeleton soon covered in algal film. Typical circular white patches clearly visible
Sedimentation and pollution (mainly garbage but also waste oil and fuel leaks from motorised vessels etc)	Farmers and fellers of trees (for firewood/timber) Everyone (garbage) Owners of boats with engines (oil etc)	♦ Severe: Burying of coral colonies ♦ Lesser: Reduced water quality, stress to corals/other organisms ♦ Can cause ecosystem change to an algal dominated state
Predation by "plagues" of the corallivorous mollusc *Drupella sp.*	Natural or possibly due to ecological imbalance, mainly on branching corals	Coral polyps eaten from the bottom up, tips last, *Drupella* can be seen hiding in the lower branches of the affected corals

From Table 28 it is clear that conservation is necessary, and that the socialisation of some aspects at least needs to include Government, especially those involved in public works, as well as fishers and the general public.

Blast fishing effects have been extensively studied and the immediate physical impacts are easily understood, though economic and other longer-term implications are often under estimated (Pet Soede *et al* 1999). OFC could be among the loosers from bomb-fishing activities. Coral mining is a major and often under-estimated problem. Unless Government projects cease using this material it will be impossible to enforce the law banning this activity.

The use of cyanide for some OFC activities has effects both upon the sessile invertebrates such as the coral itself, and upon both target and non-target fish . Fish receiving a lethal dose will die,

either immediately or soon afterwards. Fish receiving a non-lethal dose will be affected long-term. Target fish are likely to die either in transport or soon after purchase (Rubec and Cruz 2005, Schmidt & Kunzmann 2005). Non-target fish will be unlikely to compete in the natural environment and will most likely fall prey to predator species or to disease. Therefore the habitat (on which all coral reef fisheries depend, for food fish, invertebrates and ornamental fish) and the fish stocks themselves will be adversely affected. Some of the dead coral seen was due to cyanide use, and some of the recently killed coral (that not due to COT or *Drupella* attacks and not consistent with temperature related bleaching patterns) is almost certainly the result of cyanide use.



Bomb fishing damage ***Abalone fishing damage*** ***Garbage***

Coral mining damage ***COTs*** ***Drupella***

Figure 50 - Threats to Banggai Archipelago Reefs

Several sources of mechanical damage to the reef (collecting of invertebrates, anchoring, breakages during ornamental fish collection and to a lesser extent trampling during the course of other activities) all have similar effects although the shape and extent of damaged areas can vary. All are potentially serious and capable of causing damage faster than natural recovery processes can repair it. Greater awareness and in some cases additional skills (e.g. in OF) or facilities (e.g. permanent mooring facilities) could prevent much of this damage.

The remaining threats though currently seemingly having less impact, are actually harder to deal with. Enforcement of land-use legislation would go a long way to dealing with sedimentation, as would re-aforestation of the steepest cleared areas. Most of the remaining effects could be mitigated through mangrove conservation and restoration. Both easily said but much harder to implement.

Enforcement of fisheries legislation would reduce the fishing pressure on *Cheilinus undulatus*, the Napoleon Wrasse, and might eventually help reduce COT numbers, but this cannot be guaranteed. No-one seems to know what to do about *Drupella* plagues, also seen in Bali. Garbage disposal is a major and fast-growing problem, and will increase exponentially with increased incomes as people purchase more packaged goods, all in the obligatory plastic bag. Provision of oil and other chemical waste treatment is unlikely in the near future.

A few representative images of Banggai Archipelago underwater can be seen in Figure 51 below. More can be seen in Appendix 7.

Tj Nggassuang Reef | *Typical "lagoon" BCF habitat* | *Monsongan Reef*

BCF in Urchins | *Schooling fish* | *Anemone Fish*

Figure 51 - Banggai Archipelago Underwater Scenes

Banggai Cardinalfish stocks

The team undertook a limited survey of ***Pterapogon kauderni*** (BCF) populations, the results of which are summarised below. Transect survey data are given in Table ?? and Swim Survey data in Table ??. Juveniles were defined as fish under 3.5 SL (Standard Length), the lowest recorded breeding size, however most juveniles seen were well below this size, with very few fish between 2cm and 5cm SL being seen at heavily fished sites.

Observations seem to support the theory of an ontogenetic shift between sea anemone habitat for smaller juveniles, including the smallest fish seen (around 1cm SL), while all size classes over about 1.5cm SL were seen in diadema urchins (the majority of fish) and mainly large fish of 4.5cm SL and above seen in branching coral stands, with no small juveniles seen in the branching coral habitat.

The data show severely depleted stocks at heavily fished sites, but the data from Tj Nggasuang, the site fished on a rotation basis, and the high ratio of juveniles in most sites, would indicate good recovery prospects for all except Liang Island and that a sustainable fishery is a realistic possibility.

At all sites visited, even those seen in passing and where no formal survey was done, the number of *Diadema* urchins was high, and well capable of providing habitat for a sizeable BCF population. This is worth noting as one fear raised at the post-survey stakeholder meeting in Banggai was that the predilection of some Banggai islanders for consuming these urchins could pose a threat to the BCF population. Pictures of BCF in various habitats and densities are given in Appendix 3, and some underwater video-clips are given in Appendix 7.

Table 29 - *Pterapogon kauderni* Transect Survey Data

	Monsongan Fishing Ground	Bone Baru Fishing Ground	Pearl farm Unfished Area	Average	Monsongan/ Pearl farm Ratio	Bone Baru/ Pearl Farm Ratio
Juvenile BCF	76	51.5	339	155	22%	15%
Adult BCF	27	41.5	242	103	11%	17%
Total BCF	103	93	560	259	18%	17%
Juvenile/ Adult Ratio	6.46	1.38	1.5	1.89	430%	92%
Diadema Urchins	745	459	279	495	267%	165%
BCF/Urchin Ratio	0.14	0.28	1.98	0.48	7%	14%
Adult BCF/ Urchin Ratio	0.04	0.09	0.87	0.20	4%	10%
Fishing Pressure	3 (Heavy)	3 (Heavy)	1 (None)			
Remarks	Regular Harvesting	Regular Harvesting	Never Harvested?			

Table 30 - *Pterapogon kauderni* Transect Survey Data

	Liang Harbour	Liang Island	Bone Baru	Toropot	Tinakin Village*	Panapat # Tj Nggasuang	Average
Juvenile BCF	320	11	213	778	233	1434	498
Adult BCF	55	2	75	421	49	398	167
Total BCF	375	13	288	1199	282	1832	665
Juvenile/ Adult Ratio	5.82	5.50	2.96	1.85	4.81	4.81	4.29
Diadema Urchins	147	257	910	1086	245	276	487
BCF/Urchin Ratio	2.55	0.05	0.31	1.10	1.15	6.28	1.91
Adult BCF/ Urchin Ratio	0.4	< O.01%	0.08	0.4	0.2	1.4	0.3
Adult Ratio to unfished[1]	43%	< 1%	9%	44%	23%	166%	39%
Fishing Pressure	1	2	3	3	2	2	
Remarks	Unharvested but Disturbed	Harvested Heavily once > 1 yr ago	Regular Harvesting	Regularly Harvesting	Previously harvested regularly but stopped	Harvested at long intervals	

[1] Adult BCF/Urchin Ratio for the location divided by Adult BCF/Urchin Ratio for the Pearl Farm

3.6.3. Livelihood Patterns

Livelihood patterns were only available in any detail for three villages, Bone Baru, Monsongan and Panapat. Where relevant information for other villages is available it is also shown. More information and photographs of the livelihood activities of OFC families and other villagers are given in Appendix 2 (A2.1) and some video-clips in Appendix 7. Overall it was clear that patterns were different depending on the ethnic group of the OFC families. Bajo people had very few non-marine activities, and where they did have, these were usually very secondary, and gender divisions (almost absent in traditional Bajo lifestyle) though present were less marked. Banggai men are almost all "amphibious", equally at home in marine and land-based activities whereas the women stay on land except for travelling, and these families often have farming as a main or important secondary occupation.

Farming is mainly for long-term plantation cash crops (coconut, cove, cocoa, cashew nut) or staples (root vegetables, maize and pulses). In terms of fin-fish fisheries, main target species seen in either fresh or dried state in most villages included Carangidae, Caesionidae, Scaridae, Serranidae, Haemulidae, Lethrinidae, Mullidae, Lutjanidae, Acanthuridae, Siganidae, sharks and rays and most small pelagic species (such as sardines, mackerel, horse mackerel etc). Squid are also a major fishery and other molluscs (octopus, shellfish including Tridacna clams, protected) are heavily fished in some villages. Reptiles (marine turtles, protected) and mammals (dugong, protected) are also target species.

3.6.3.1. Sources of Income and who earns

Bone Baru

Other than OFC, livelihood activities by the OF collectors include mainly other capture fisheries (general food fish and squid), and the production of salt dried fish (***ikan asin***) and dried squid (Figure 52). In addition to the production of ***ikan asin,*** Bone Baru is a trade centre for this commodity, with fishers from all over Bangkep bringing their produce to Bone Baru from where it is the sold to bulk buyers. The capture fisheries including OFC are carried out by male family members, while women are often involved in post-harvest activities, including tying up, drying, selling, etc. However some OFC family members also work on plantations, or have other often transient occupations.

Figure 52 - Ikan asin in bulk and dried squid

The cyanide-caught food fish are not generally destined for the LRFT (Live Reef Fish Trade), but for local consumption (in Bone Baru or Banggai) as fresh fish, or dried for sale as dried salt fish (***ikan asin***). Fish to be dried are immediately gutted and prepared by the fishermen's wives upon landing, while fish for sale fresh are made up into ***cucu***, roughly similar-weight groups of fish tied together by rafia, plastic string, strips of rotan, or any other available string-like material, and sold for a fixed price which depends on season and demand versus availability. The fishermen were aware that the use of ***potas*** can damage the reef, but seemed unaware of the hazards to human health from consuming freshly caught cyanide killed fish. An average catch is 5 to 10 ***cucu*** and the average sale price is 5,000Rp, giving a gross income of 25,000 to 50,000Rp. per trip.

The squid fishery is a major occupation for most fishers and their families from October to December. Squid are sometimes boiled before drying, sometimes not, depending on the buyer's requirements, but always salted. Drying is done on special racks (Figure 53) but not covered from flies or other sources of dirt/bacteria.

Salt is required in large quantities for the main squid and dried fish fisheries, and is mainly imported from Madura via Luwuk, there is no local salt production.

Figure 53 - Squid drying racks in Bone Baru

There are extensive clove plantations which during the harvesting season require much extra labour, boys and young men to climb the trees, a dangerous occupation needing incredible balance and only for the light weight. Other family members, mainly women and children, tend to be involved in processing: removing stalks, sorting, drying etc. Most home improvements or large outlays are financed from the seasonal squid fishery and/or clove plantation work.

There are several weavers, all women and including wives of ornamental fishers, making "***tikar***", woven grass mats, which sell for around IDR 15,000 (Appendix 2, A2.1). The leaves are first hung up in bunches, then made into long strips which are dried in rolls. These are then woven into the mats. Others produce the traditional "***atap***" palm leaf roofing slabs (Appendix 2, A2.1). For both the leaves are collected from the mangrove areas.

Vanilla planting has recently taken off in quite a big way. The "***air bersih***" fresh water in the tanks (Figure 10a) comes from the hills, which are all cultivated (mostly plantations, some seasonal crops). When it rains the supply is good, when it doesn't rain for several days these dry up, and people revert to the wells, which also dry up by evening, though they are generally full again in the morning. Increased use for thirsty vanilla plants has exacerbated the problem, with people and crops competing for limited water resources. All family members may be involved in the chore of watering.

Monsongan

Other than OFC, livelihood activities by the OF collectors include mainly other capture fisheries, and for all, fishing is the major occupation. What type of fishing depends on demand and available equipment. Information on other fisheries is shown in Appendix 2 (A2.1).

Teripang (sea cucumbers or holothurians) and ***Kima*** (tridacna clams) are major target species (Figure 54). Note that the clams are protected by law, so this fishery is illegal.

Figure 54 - Teripang drying, Tridacna clam meat & fish on the way to market in Monsongan

General food fish are caught for sale fresh and for the production of salt dried fish ***(ikan asin)***. Target species include trevallys/jacks (Carangidae), fusiliers (Caesionidae), parrot fish (Scaridae), most small pelagic species (such as sardines, mackerel, horse mackerel etc) and most edible coral reef or other demersal fish. Main fish species families which were seen among freqh or dried fish captured include Serranidae, Haemulidae, Lethrinidae, Mullidae, Lutjanidae, Acanthuridae, Siganidae, sharks and rays. Capture methods include gill net (main method), hook and line and destructive methods (the use of explosives or poison).

Some fishing is done using garage forecourt type compressors (Appendix III) for ***hookah*** diving, particularly for ***teripang*** and sometimes lobster, diving accidents do happen. Squid and octopus are also fisheries which can provide good incomes seasonally according to locals. There are indications of trade in marine turtles (illegal as all 6 species of marine turtles found in the country are protected under Indonesian law), though little detail is available on this point.

Fresh fish sale is facilitated by the availability of ice, produced in home freezers by at least one key informant (Hj Umrah). The cost is 500Rp. per block. There are several ***Padola*** or local buyer/sellers of fish and other marine products, and most take the produce to market in Banggai using ***sampan***. Most are women, and often meet the fishermen before they come ashore in order to buy their catch.

Few Monsongan OFC take part in any farming, though some do own small plots with a few trees of cash-crop species or work as hired labour in hard times. When registered fishers own land, they do not qualify for government programmes unlike registered farmers. Families cannot be officially registered as both.

Some OFC family members are involved in other activities such as building labourers or other low-skilled labour. Many girls wish to work in shops and a few do, in Banggai.

Seaweed farming was tried before the earthquake with government support as previously described. Since the failure due to the earthquake side-effects, people have no risked trying again until recently. Now some Monsongan villagers, including OFC families, are trying again, raising the capital themselves from the proceeds of other fishery activities.

According to the village Head, when people do get large sums of money, they tend to waste it on luxuries or a few large items which are inappropriate, e.g. boats of a size and type which are not viable long-term because of routine operational costs and maintenance.

Panapat

In addition to OF, Panapat OFC take part in seasonal fishing of grouper spawning aggregations, and regular fishing for local consumption. Most also farm. Which out of the fishing or farming is most important depends on many factors, including individual family circumstances, seasonal factors, market influences etc.

Although not mentioned by villagers there are strong indications from a number of other sources that Panapat OFC and other fishers are heavily involved in the (illegal) capture and trade in marine turtles, especially green (*Chelonia mydas*) for meat (Figure 55) and hawksbill (*Eretmochelys imbricata*) turtles for their valuable shells (tortoiseshell), in particular for sale in the predominantly Christian District of Totikum (green turtles) and to Bali (both species).

Figure 55 - Green Turtle washed ashore

Muslims such as the Panapat fishers have religious rules which discourage the consumption of animals which spend part of their lives on land, part in the sea (***antar dua alam*** - between two worlds) but unfortunately not their sale for consumption by others.

Tolokibit

Most Tolokibit OFC are of Banggai ethnic and also take part in seasonal squid fisheries and in farming activities, especially plantations, either their own, working for other villagers (including wider family members) or seasonally employed by major plantation owners**.** Abalone is a major

fishery here, for the meat, which is dried. Shells, also a potential commodity, are discarded. The means of collection is seemingly destructive.

Toropot

Seaweed farming and other fisheries are the other occupations of OFC, very few Toropot families, almost all of whom are Bajo, take part in land-based livelihood activities.

Seaweed farming is a growing occupation in Bangkep, where there are extensive areas suitable for this activity (France Aquaculture 1991). In one of the Panapat ***Dusun***, Tj Nggasuang, Liang and in other areas passed by during the study, extensive areas of seaweed cultivation (Figure 56) were seen. It was obvious from the Toropot and Tj Nggasuang surveys that seaweed farming and BCF fishery are compatible, and from the Liang example that seaweed farming can have the secondary effect of preventing more destructive activities.

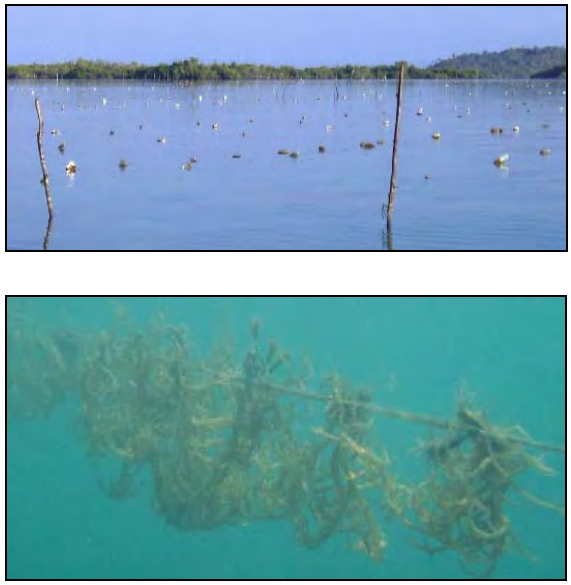


Figure 56 - Seaweed Farming in Toropot Lagoon

Tolokibit

Currently there are around 20 fishers who take part in OFC, mainly of Banggai ethnic origin. This has been a stabile group almost since the OFT started in Tolokibit. OFC is the main fishery for these people, but it is not their only income, as most also have land and do some farming (coconut Figure 57, cashew nut and cocoa, see Appendix 2, A2.1). There are 40 fishing households (with no other income) and 113 farming households in Tolokibit Dusun. Many of the latter also fish.

Figure 57 - Coconut groves lining Tolokibit shoreline behind Bajo fisherfolk houses

Seaweed farming: this activity needs needs good water movement, so the rougher weather which curtails other activities favours it, and it is now an important part of some Tolokibit OFC (and other villager's) livelihood strategies.

Other Fishing: The other main fishery is ***cumi-cumi*** - squid, which is seasonal. Squid are caught around the full moon, when almost all the Dusun goes to sea, often 8 or more per boat, mainly around Kenau Island. They are sold dried. Abalone are also fished, found under the coral rocks, these are dried too, price depends on size class. The abalone fishery is responsible for some of the coral damage seen. The fishermen overturn the corals to take the abalone which they prize off the rock surface. A dried squid/abalone buyer in Banggai gives loans to the fishers, and deducts it from the price for the catch. All parties were said to be happy with the arrangement which was felt to be fair. For squid, most families would sell around 20-30 kg per musim (per full moon) at 45,000Rp per kg, a good income.

Farming: Most families have coconut groves (Figure ??), but the price of copra is such that at present there is very little income, even a loss at times. The village could easily supply the 1,000 nuts per day required to run a machine such as that set up in Labean to produce high quality oil, for which the buyer is based in Luwuk.

3.6.3.2 Health & Education

Health services and facilities are shown in Appendix 2 (A2.4), and where information is available is given below per village as well as general points. Some additional information is given in Appendix 11. Education on a village level is shown in more detail in the village profiles in Chapter 3. General points are made in this section and some additional information is given.

3.6.3.2.1 Health

Health is clearly an important part of overall livelihood conditions. Because of this, information was sought not just in the villages but from the health-care providers. Two main Government departments are involved, the Health Department (Dinas Kesehatan) and the Family Planning Unit (BKKBN - Badan Kordinasi Keluarga Berencana Nasional), which is now merged with the population census and civil registry units for administrative purposes, but still operates in effect as a department. More information on these is given in Chapter 3, site overview, and in Appendix 11. For Family Planning (KB - Keluarga Berencana) the DK is the implementing agency, administering the treatments whereas the planning and provision of contraceptives (pills, coils, etc) is from the BKKBN. The two work closely together. Both give health advice and the BKKBN keeps detailed records at the household and village levels.

The Health Department

The head of the Department (Dinas Kesehatan or DK), Kadis Dr Syahrullah K. Ngongo M. Kes. and Pak Ramli (Tata Usaha, administration) were the main KI (Figure ??) for this department. Pak Guzaif Dunggio from the Banggai main clinic (which has an in-patient clinic and serves the whole of Banggai District and often people form the outlying islands as well) and Bone Baru sub-clinic ***bidan Desa*** (village nurse/midwife) Ramla S. Hasan also gave much information for the clinic side.

All health care personnel were very keen to help and pleased that health was considered a part of ***kesejahteran*** - the best translation for livelihood we could find. These visits were considered necessary after realisation that secondary data were way out of date as there had been many advances in health care and in order to enquire about the supply of oxygen.

Assistance included a guided tour of the new hospital being built in Adean village about 6km from Banggai town centre in the Department car, as well as information and transport to Bone Baru in the Clinic Doctor's car (Figure ??), including on this occasion assistance in obtaining relevant health-related information. The Department Head is keen for the DK to be involved in efforts to assist poor people, and also as future suppliers of oxygen in technical aspects of the OFT.

Figure 58 - PUSKESMAS car in front of Bone Baru OFC house, Tumbak boat in background

Under the same MATRA programme as the oxygen, the DK hey also have plans for a pressure chamber (very interesting for diving fishermen as well as tourism. Pressure chamber operating staff have already been trained although when a chamber will be available is not yet sure as no source of funding has yet been identified. Compressor diving used to be a big problem, but now is less so, as the main use was for pearl diving, which has been largely replaced by pearl farming.

The Regency has been independent for 5 years, originally little infrastructure and 80% of that was destroyed by the earthquake in 2000, the first year of independence - clinic and residential buildings, equipment, etc. The old buildings were mainly in poor repair or of poor construction quality (project factor), so that may explain why proportionally more health facilities than private homes were destroyed. After the earthquake there was no aid for health care, only food

and materials for rebuilding buildings, mainly houses. There were very few staff, with only 3 doctors. In addition, being an archipelago poses many challenges. Therefore a step - by step capacity building plan was drawn up.

- **Physical Infrastructure:** for the first 2 years, 2001/2002, physical buildings were the first priority, mainly (if not all) from APBD - Regency budget, not Provincial or National. In 2002 and 2003 there was an ADB programme (loan not grant) called DHS - Decentralisation of Health Services, which is still ongoing. This has helped to rebuild and improve infrastructure, including the admin and outpatient building of the new hospital. By early 2003, the physical infrastructure was already 80-90% rebuilt as good or better than pre-2000 - pre-Earthquake). Finally a new hospital (Figure 59) is being built which will be the largest and most versatile in the Province outside Palu, and will cover Maluku Utara as well as Banggai Regency. It is being built and equipped in stages. A visit was made and photographs taken. The hospital should open during 2005

Figure 59 The new Hospital at Adean and Abigail Moore with Pak Ramli and Dr Ngongo

- **Equipment and supplies:** In 2002/2003 there was also a PEMDA (local Government) programme for PUSKESMAS (main clinic) equipment and supplies (peralatan).
- **Human Resources:** In 2003, a programme was started to improve the number and qualifications of personnel (SDM = human resources). This included employing 11 additional doctors, and now all 14 PUSKESMAS have a doctor (GP). Most PUSKESMAS situated in Kecamatan capitals. Paramedical staff (70) have been recruited to cover the PUSKESMAS and POSYANDU (Puskesmas Pembantu) across the Regency. The programme aims to have a Bidan Desa (village nurse/midwife) in every village, so far nearly all have one but not all. The specialist Doctors for the hospital will be provided initially by by UNSRAT (Universitas Sam Ratulangi) in Manado, with specialists in general surgery, obstetrics/gyneacology and anaesthetics. In 2005 further recruitment of nurses and other "paramedics" is planned. There is a programme subsidising and/or facilitating access to medical training for local youth with the hope that in 10 years time nearly all staff will be of local origin.
- **Upgrading of local services:** Four PUSKESMAS were upgraded to inpatient capacity in 2003: Banggai (Figure 60 and Appendix 2 - A2.4), Totikum, Salaka and Bulagi), and just recently Bungin (Bokan Kepulauan) was also upgraded.

  The other PUSKESMAS are in Saleati, Mansomet, Sabang, Patukuki, Lolanta, Tataba, Lumbi-lumbia, Libulalong and Lantibong.

Figure 60 - Banggai Puskesmas, in-patient unit

- **Access for all:** At present Luwuk is the nearest hospital and it is very costly to go there, so very few people have access to hospital treatment up to now. The DK is trying hard to get the new hospital open as soon as possible, and to find ways to minimise the cost of services to the people. The DK Head feels that the nation has a great responsibility because the people are not yet "mampu" - able to look after themselves. In 2005, a new programme starts under which all poor people will have health insurance from the state (Central Government), that is those who qualify as "pra-sejahtera". There is a time window for obtaining a "surat keterangan miskin" or certificate of being poor, from the village head (KD). PEMDA is setting a standard charge for an out-patient visit to the health services, including diagnosis and medicines, at only 5,000Rp, less than buying most medecines from the kios or going to the Dukun (medecine man/traditional healer) - a packet of cigarettes for the dukun costs around 7,000Rp. This is a very big subsidy, and will cost the government a lot.
- **Preventive Care:** There is a preventive medicine programme, especially for infectious diseases, malaria and "demam berdarah" a mosquito transmitted disease which is more often fatal than malaria. Hygiene is a main point in this programme, including "environmental health" which includes rubbish disposal and sanitation. Under this programme, people are given the materials to build septic tank toilet facilities, usually the actual toilet unit (squat/turkish type) and cement. Often in the past WC/washing areas have been built without installing proper water supplies so they are useless. This point was stressed also by the BKKBN as being a signal failure and sad waste of resources.
- **Malaria - a Major Problem:** Malaria is endemic almost everywhere, though there are hotspots. The coast is almost all high-risk, and it is feared there may be chloroquine resistant strains already in some places.
- **Chain of referral:** The Bidan Desa - village Nurse/Midwife - is often the main medical care practitioner in a village, dealing with not just childbirth but also KB and most minor medical problems. She will send cases beyond her knowledge or capacity (including from lack of equipment) to the District PUSKESMAS. If they can't be treated there, they will be referred to the hospital in Luwuk, until the new hospital opens.

PUSKESMAS and Posyandu Services:

PUSKESMAS Banggai (Pak Guzaif Dunggio)

The Banggai PUSKESMAS or main clinic (Figure 61) covers all of Banggai area for in-patient and GP treatment, and works with the ***posyandu*** (sub-clinics) in the villages. There are 5 main programmes plus others.

The Bidan Desa (village nurse/midwife) usually lives in the village where she is posted and goes to people's homes, which could be why in the Venn diagrams she is seen as being close to the people.

Figure 61 - Bone Baru PUSKESMAS, Patients awaiting Treatment

All other services and staff usually expect people to come to them at the PUSKESMAS, ***Posyandu***, ***Balai Desa*** (village meeting place), or other fixed "formal" environment. Main programmes are:

- **Pelayanan KIA**: mother and baby programme, includes the implementation of family planning (KB). Deals with all issues surrounding giving birth, from pregnancy (mainly controlling), delivery until after the "***masa nipas***" - the danger period, which is usually around 40 days. Includes checking the mother until any wounds (e.g. vaginal tearing, which

is usually stitched) are healed and dealing with the umbilical chord which is usually tied and tended until it drops off. Babies and mother s are washed. Pregnant women register with the Posyandu, and are normally checked every 2 months, then weekly as delivery approaches. Post-natal care is organised at the Posyandu for immunisation, weighing etc. Includes immunisation of engaged couples and pregnant women (tetanus, BCG), babies (BCG, diptheriea, ***Campak*** =measles?) and of toddlers (hepatitis B)

- **Mental health (pelayanan kesehatan jiwa):** depression, sleeping disorders, etc... not yet very good
- **UKS** : - Usaha Kesehatan Sekolah = school health care. So far restricted to dental care, mainly preventive - how to care for teeth (e.g. brushing, diet) and why it is important to do so. There is still only one dentist for all of the Regency, who can do fillings. Several people can pull teeth and make false teeth. It is hard to get the materials for fillings and other dental care. Dentistry is an expensive, private service.
- **Kesling:** Environmental Health (Kesehatan Lingkungan) mainly consists of giving advice on cleanliness, including rubbish disposal, sanitation (how to make a family toilet, generally for a group), general hygiene, etc. For sanitation there are no more free constructions, but technical advice is given free, people have to supply the materials and labour. Use of sceptic tanks is a problem, as they become full and can't be emptied, so then have to build a new one. (Note, BKKBN said people usually use soak-aways, as in many other areas of Sulawesi, so pollution rather than filling up becomes the problem). Often combined WC and washing facilities (MCK) are built with no water (see Appendix A2, A2.2), through lack of co-ordination between PU (public works), PAM (water supply authority) and the Health Department.
- **Malaria:** The anti-malaria programme used to be run by Pak Guzaif, so he has detailed knowledge of the problems. There are three "pillars", ***penyuluhan*** (advice), ***pengobatan*** (treatment) and ***pemeriksaan*** (examination). Main points are given below.

- Most pregnant women have malaria, which causes them to suffer from anaemia. WHO standard 422 says that malaria medecines are not a problem for the foetus during pregnancy but many people are still wary, and treatment is often deferred to after giving birth. This means that babies are not infrequently born with malaria. Usually they are treated once 2-3 months old, most do survive. If the mother has an acute attack of malaria (panas-dingin - alternating hot feverish and cold shivering) during pregnancy, the foetus or if born the baby rarely survives.If the mother has chronic malaria, she is often feverish, and her milk is often of poor quality and/or low volume. This situation is generally compounded by poor diet with low protein nad vitamin levels (mainly starchy foods such as rice, sagu, casava etc)
- When going to a high-risk area it is recommended to take preventive medecine once a week. There are two main malaria seasons, January-February and May-August. He feels there should be preventive measures taken to anticipate these periods of high risk, but at present there are none.
- Pak Guzaif has made a map of the endemic malaria areas, which include Tinakin Laut and Paisonisoni, the village just North of Bone Baru. However generally the whole of the coastal area of Banggai Island has a high level of malaria infection, and indeed the FGD and other contacts in local villages revealed Malaria as a major health concern in all villages and all OFC families.

- The current anti-malaria programme has run for 6 years with no noticeable impact. This has included: (i)giving out preventive medicines (for weekly consumption): many people forget to take them, can't be bothered to collect them, or refuse to take them and (ii) insecticide sprays (large-scale): ineffective because only kills mosquitoes in and around the houses. Those in surrounding areas (marshes, woods, road side ditches, cultivated areas etc) just move in to replace the dead ones, usually takes a few days to return to previous levels. In

addition, within the homes and villages many larvae survive because of poor hygiene and environmental health practices (uncovered water buts, wells, etc, puddles in refuse such as coconut shells, plastic/metal items etc, blocked drainage ditches, etc....)

- Pak Guzaif feels that to reduce or even eventually eliminate malaria, the strategy needs to be changed. His professional opinion, based on his years of experience, is that the most important aspect and most effective approach is increasing people's awareness and understanding of how malaria is transmitted, why certain actions and habits will assist in reducing malaria - in terms of both numbers and severity of cases, and what actions to take in case of malaria symptoms appearing (proper treatment).

Posyandu in Bone Baru (Ibu Ramla S. Hasan):

Ibu Ramla has been Bidan Desa based in Bone Baru Posyandu (Figure 62) for 1 1/2 years, but has been a Bidan in different villages for about 8 years, she started at the age of 19, in a remote mountain village. She has training in midwifery and perinatal care, as well as general paramedic training.

Her main duty is looking after pregnant, birthing and lactating mothers and their babies, but she also takes care of most everyday illnesses and injuries.

When something is beyond her skills she can refer patients to the Puskesmas in Banggai which has an in-patient department and GP. There patients may be further referred to Luwuk.

Figure 62 - Bone Baru Posyandu and Wall-Chart Record Keeping

The key to trouble free births and post-natal nursing according to Ibu Ramla is having regular check-ups. All the birth complications she knows of which have had fatal outcomes (for mother and/or baby) have been cases where the mothers have either not reported their pregnancy or not

received regular checks. Where there are checks, if need be mothers are referred to Banggai or even Luwuk (e.g. anticipated breach births). Now in Bone Baru all mothers use her services if she is there, though many also call in the Dukun, however when as recently she is away (this time on a training course), the Dukun is the only option.

Water is a big problem. Often when dealing with births in the dry season, finding enough to provide proper cleaning for mother and baby is a big challenge, especially late in the day when the well are low and have not yet started to re-fill overnight.

BKKBN - Family Planning

The BKKBN (Badan Kordinasi Keluarga Berencana Nasional) has been merged with the Catatan Sipil to become the Badan Kependudukan, Catatan Sipil dan Keluarga Berencana. The head of the new organisation is Pak X Bailia (Figure 63), who provided most of the information contained in the section. Pak Bailia also had very strong views on poverty, which he sees as the underlying cause of many health problems, and positive ideas on poverty reduction, which are given in the section on social structures and wealth perceptions.

Figure 63 - BKKBN Head Pak Bailia with Abigail Moore at the BKKBN Office in Banggai

- **Role of the BKKBN:** The BKKBN deals with and gives ***penyluhan*** (advice) on family planning (KB) and matters related to population records, such as national identity cards (KTP) and other official documents which are issued by them (e.g. ***kartu keluarga***, a pre-requisite for many official purposes including applying for a passport, poverty assistance, etc), the registration of births, deaths, marriages, adoptions and other changes in status or residence. For contraception, the BKKBN organises the buying and distribution to the health care workers, who then deal with the medical side. However the field staff from the BKKBN go to each household individually to collect data and to give advice, as well as sometimes holding meetings in village meeting places. They provide information and advice on family planning to all ages, both sexes and all levels of society.
- **Policy:** There is no longer an "ideal" family, unlike the previous "***Orde Baru***" government (Suharto) which strongly advocated only two children. Now the accent is on giving people the means to make an informed choice, and the ability to plan their lives, not on imposing a policy. Generally however the advice is to have as many children as people want (whether it is 1 or a dozen...) as young as possible, with reasonable gaps for the mother's health, then preventing further unwanted pregnancies. The "watchword" is "***keluarga berkualitas***" - quality families.
- **Participants:** All contraception must have the permission of both partners, usually this means the husband's consent as male contraception is rarely used. The figures for active KB participants are based on couples who have been in the system for at least several months, new couples are not listed until they seem to be established in the use of KB. The figures list numbers of couples of reproductive age and numbers using KB. The aim is for all couples of "reproductive age" to be involved in the programme, whether currently using contraceptives or not (e.g. when actively wishing for more children).
- **Field workers:** There are 25 District-based field workers, who are supposed to check every couple every month, and figures are based on these checks. However as they have no transport (motor bikes, boats) and rely on public transport (for which there is sometimes a budget, sometimes not) or lifts, they cannot always cover the whole of their area. Even the Head doesn't have a car, though a motorbike for official use is provided. The field workers have monthly meetings where the data is collated, wages are given, and usually there is advice and sharing of experiences (successes and failures), sometimes further training, so all can go back re-motivated and feeling truly part of a team. Constant improvement of SDM (***Sumberdaya Manusia*** - human resources) is a keystone of BKKBN policy.
- **Data management:** A total of 14 employees are based in the Banggai office. All systems are still manual, the computer is only used for entering data to be sent to the "***pusat***", (Head office) in Jakarta. Data given to the team was hand-written and a photocopy provided.
- **Use of local volunteers:** In each village there is a "***pos KB***" or family planning post, manned by 1 or 2 local people who have been given some training. These people work on a voluntary basis. The initial training was done by Kecamatan (District), and there are regular training sessions to ensure that natural wastage is accounted for. Pak Bailia feels that it is these posts which are responsible for the exceptionally high KB participation rate in Bangkep as a whole, though there are exceptions, e.g. Toropots. The support of religious leader has also been a major success factor. Participation rates for the areas surveyed are shown in Figure ??.
- **Lack of resources:** There is only operational funding every 3-6 months, not enough for the field workers to maximise their effectiveness, as transport costs. In the 1980's there were some motorbikes and a boat (1987), but all have now fallen to pieces. What is left of these is still in the ***gudang*** (store).

➢ **Data related issues:**

- The data covers poverty issues but NOT occupations, so numbers of say poor farmers or poor fishers can't be extracted (except maybe by taking the names and finding out who does what). Pak Bailia said that it would really be more effective for other departments to agree with the BKKBN to ask a few extra questions than to set up their own data collection systems. If there could be some contribution, e.g. to transport, all would benefit. This would work for data such as occupation, vehicle/boat ownership, means of production (e.g. types of nets and other equipment used in fishing), though could be difficult for production figures (e.g. fisheries catch data) where quite a lot of specialised knowledge and understanding (technical and even more so socio-economic) is needed in order to know how to extract meaningful information.
- Welfare categories and the meaning/use of the indicators: quite a long discussion was had on this subject, and copies of the field data forms were used as a basis for discussion and given for the programme record. For example, for poor families (pra-sejahtera), there are three main considerations, which loosely translate as food, clothing and shelter. If only one of these is OK, the family is still poor. If two are OK, then the family will be in the next category, "sejahtera I". Some of the criteria for the highest categories would not be fulfilled by even many rich people (e.g. regular charitable giving, types of family interaction or involvement in certain types of organisation).
- The KD and BPD have to countersign all the data collected, and therefore take joint responsibility for it's accuracy, with the field staff.

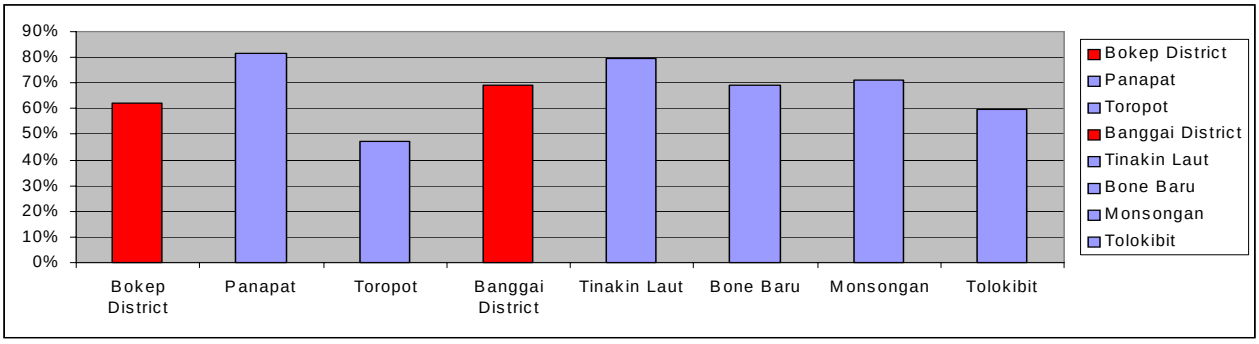


Figure 64 - Participation rates in family planning (contraception) in 2003 (BKKBN Data)

Bone Baru

In addition to the FGD, Pak Guzaif from the Banggai PUSKESMAS assisted with obtaining health-related information during the visit using the PUSKESMAS doctor's car (Figure 65). It seems that since the new KD took over in 2003, health care has improved. "Kartu Kesehatan" (cards giving a right to free or very reduced health care) have been issued to poor and elderly (over 50 years of age) individuals and families. Every month the qualifying elderly patients can visit the clinic for routine free treatment.

Figure 65 - Collecting health-related information in Bone Baru with Pak Guzaif (Left)

Malaria is still a problem, but like other common ailments is now treated at the village sub-clinic or ***Posyandu***. The FGD and other interviewees felt the ***Bidan Desa*** gave especially good service, and were satisfied with the services at the PUSKESMAS in Banggai when referrals are made.

There is no pharmacy (chemist) in Bone Baru, but in addition to medicines available from the ***Posyandu***, the ***kios*** sell some basic remedies including not only relatively mild drugs such as paracetamol and cough mixtures but also some powerful and potentially dangerous prescription

only drugs such as cheap antibiotics, mainly penicillin, analgesics etc. There are now pharmacies in Banggai, but none with a fully qualified pharmacist. Most people use both "modern" medicine, bought from the ***kios*** or provided by the local clinic, and "traditional" remedies, including herbs and "magic", though the latter seems less prevalent than in the more predominantly Bajo villages visited. Though the closest full hospital treatment is in Luwuk, for some illnesses or treatments people have to travel to Palu or even Makassar.

As mentioned in several sections, access to sufficient fresh water is still a major problem in dry weather (Figure 66). Sanitation is still non-existent for most homes, and the government built MCK (combined washing and WC facility) is falling into disrepair having never been used because no water supply was ever connected (Figure 66). These types of problems with sanitation and water supply were encountered in several other villages, especially Tolokibit. Malaria and "***muntaber***" (sickness and diarrhoea) are common among all villagers including OFC. Skin diseases (especially itching) and ear problems are frequent among OFC, but are accepted as part of the risks of earning a livelihood.

MCKwith no water supply, never used

Fresh water system which often runs dry

Figure 66 - Bone Baru sanitation and fresh water problems

Monsongan

Sanitation is still non-existent for many, indeed most homes. Skin diseases, especially itching, and ear problems are frequent among OFC, also malaria and "muntaber" (sickness and diarrhoea) are common, as is backache. Malaria is perceived by the FGD participants to be a result of the living conditions, and other common illnesses are seen as a "normal" result of a sea-based livelihood. Water provision to the household is a major task, as it has to be collected in jerrycans or other plastic containers, and carried either by boat or over the walkways between the houses.

Most people in the village use both "modern" medicine, bought from the ***kios*** or provided by the local ***Posyandu*** (sub-clinic), and "traditional" remedies, including herbs and "magic" from the traditional village healers. The Bajo fisher families of which the OFC are a sub-section, said they rarely attend the sub-clinic in the village. However the services of the ***Bidan Desa*** nurse/midwife are seen as very important, as is shown in the Venn diagram Figure ??. The health infrastructure and services have improved since 2002 (the latest statistics available), and although use of the family planning facilities is extensive within the village it was felt likely from numbers of children observed that the non-users are predominantly from the Bajo fishing community. This suspicion was confirmed by both the Village head and BKKBN staff.

Tinakin Laut: Tinakin laut is by no means the only village where compressors are used, but was the one village where severe diving-related health problems were raised as an important issue. A group of compressor fishers called in during the interview with the Village Head. Several compressor boats operate from Tinakin, but mainly for teripang and lobster rather than OF. A

fisherman was recently paralysed after diving to over 30m for a long (unspecified) time, but the accident didn't happen locally. The casualty was sent back after the accident, by his "boss" in Kalimantan. It seems he will simply be a burden on his family for the rest of his life. Apparently this is not a one-off occurrence but just one in a string of incidents, usually attributed to mystical factors such as displeasing the sea spirits. In spite of this sad example, the fishermen asked whether aid for purchasing more compressors might be available. Simple advice on the risks of compressor diving and reducing them was given, and also reasons why such aid was unlikely given the risks to human health, even if it could be guaranteed that the compressors would not be used for any DF activities.

Tolokibit: here the health care facilities in the main village (Appendix 2, A2.4) are good, but the OFC and other fishing and coastal families have limited access to them, due to distance between the ***posyandu*** and the coastal ***Dusun*** where they live. The ***Bidan Desa*** does not often visit that part of the village, and public transport is erratic, often unavailable.

Other villages: In all other villages the main issues were similar, with malaria, skin diseases, ear problems (from free-diving or compressor diving) and ***muntaber*** (sickness and diarrhoea) being the main perceived health problems. Back-ache from long periods in a small boat at sea was also raised by some fishers, though not in FGD, maybe unwilling to admit in front of other people.

3.6.3.2.2. Education

Education, formal and non-formal, is seen by regency leaders (Bupati, Sekdes, Wakil Bupati) as an essential component for development. The Regency started in 1999 with very limited educational facilities and a population with generally low standards of educational attainment. In spite of limited resources, real advances have been made, and now all villages have primary schools (Figure 67) with close to 100% attendance for this age-group.

Figure 67 - Bone Baru Primary School - a typical village school

School attendance rates for the two survey Districts are shown in Figure 68, based on BPS (2003a&b) data. For Banggai District the villages and the Town of Banggai have been separated, as there are significant differences. Bokan Kepulauan (Bokep) has a higher rate of Primary attendance and Banggai Town the lowest (in Banggai town there a re quite a number of "street children" as in most Indonesian Towns). However at higher educational levels, the situation is reversed, and the number of children continuing beyond Middle School to High School (15 - 18) is very low, only 4% in Bokep.

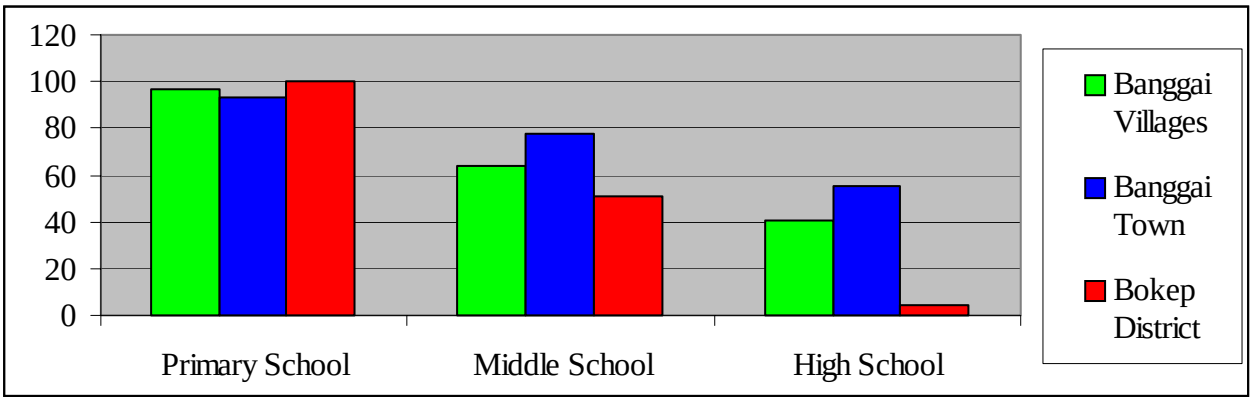


Figure 68 - School Attendance in the Study Areas

The educational attainment levels of Household Heads (KK) for Banggai and Bokep Districts, based on data from the BKKBN, is shown in Figure 69.

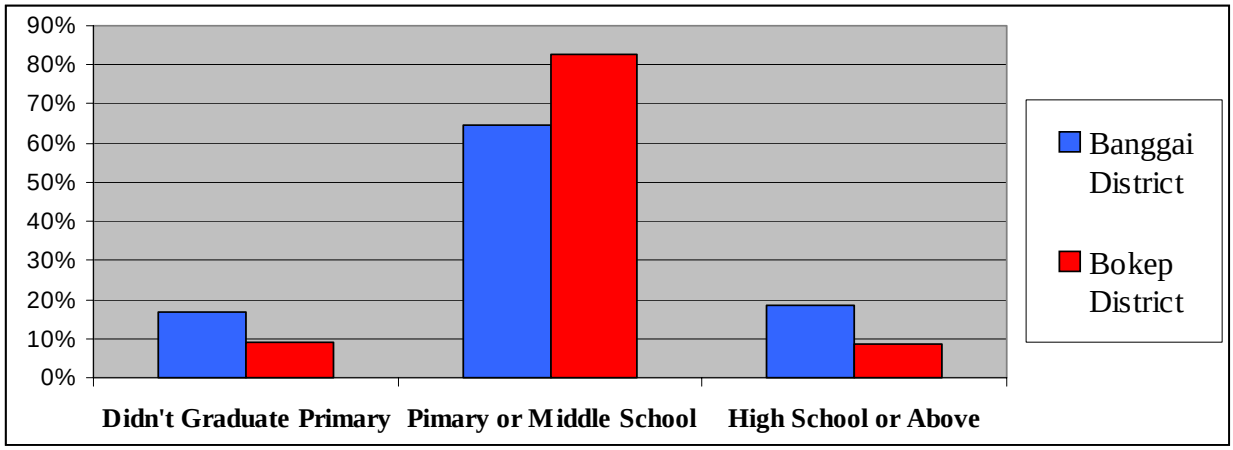


Figure 69 - Educational Level of Household Heads in the Study Areas

In addition to regular formal education, in Bone Baru a new system has been started whereby poor children who have dropped out of school are taught in a less formal way, without school uniforms and other expenses which families cannot afford. This allows children to gain at least basic literacy and numeracy skills and if they wish, to progress to Middle School (STLP) certificate (examination) level.

Non formal education is also run by various Government programmes, including the DKP, for example training in the running of small or sole-trader seaweed farming businesses was in progress during the second field visit.

Of particular relevance to OFC and other fishing families is the recent establishment of the Marine (Liang) and Fisheries (Banggai) High Schools. None of these has yet completed a full three-year cycle, but the Banggai Fisheries School will release it's first graduates in 2005.

Information on one of the Banggai Fisheries High Schools was provided mainly by Pak Faisal (Figure 70), who is responsible for data at the DKP (Appendix 11), but is also a founder member of the NGO, Yayasan Mitra Bahari (YMB) which set up and runs the school. Indeed it's existence and much of it's success is due to his ideas and enthusiasm. He gathered a number of like-minded friends in order to get the idea together and then lobbied the PEMDA and local companies to make it work. He is one of Pak Samliok's graduates from Universitas Alkhairaat Fisheries Faculty in Palu. Pak Faisal's family is originally from Ambon, but had to leave because of the troubles, and he grew up in Luwuk and Palu. Now he is really dedicated to the future of fisheries in Bangkep.

The YMB run fisheries high school (SUPM Mitra Bahari) was set up around 3 years ago by Yayasan Mitra Bahari, and currently runs a capture fisheries curriculum, though a marine aquaculture programme is in preparation, and will most likely open in 2005/2006 academic year. The other fisheries high school has also been set up by an NGO, called Karya Sama Membangun.

Unlike the Liang school these have not been taken into the state system, though there are plans for a merger and coming under local government sponsorship in 2005 for the 2005/2006 academic year.

Figure 70 - Pak Faisal, DKP Staff, and Co-Founder of YMB/SUPM Mitra Bahari

The buildings and technical teaching staff are provided by the PEMDA, but the operational costs are largely covered by YMB with funds resulting from co-operation with several private sector companies in the fisheries line who are "***mitra***" (partners) with the NGO/School. The School has a policy of doing much of the teaching outdoors, at locations relevant to fisheries, for example in the port, on the beaches etc. Environmental awareness and sustainability are seen as important but the staff have limited knowledge and materials in this area, and would welcome assistance.

Teachers are mainly from the DKP, Perhubungan (Transport and Communications) and other government departments. If the schools come under the official PEMDA wing, then the main teaching staff with be employed fully as PNS teachers, and be able to fully devote themselves to this career rather than teaching as a sideline.

The School works as a go-between in the marketing chain, collecting fish or other marine produce from the villagers and bringing it to the companies. This arrangement is felt to benefit all parties, and the fees received are the main source of income for school expenses. If the status changes, these links will be maintained, and the proposed change of status is supported by the companies involved who see it as beneficial to then also.

The aquaculture syllabus in preparation is designed to complement the building of the BBI (hatchery) in Bone Baru. It is hope the pupils will become the implementers of the programme in the villages.

Faisal hopes the Yayasan/School can become a centre of data and information on marine matters, which will be respected and used by the local Government and other stakeholders. He and the other members of YMB want to liase with STPL and other organisations like YPH to co-operate in capacity building and other areas. The School is promoting higher education to it's pupils. Films and photographs of Bangkep underwater were given to Pak Faisal on a CD for use at a forthcoming "***pameran***" (exhibition) in Jakarta to which the school has been invited, and for use in teaching.

3.6.3.3. Standards of living and wealth perception

Standards of living and wealth are subjective concepts, and though social scientists have made many attempts to produce objective criteria, there is still no absolute standard agreed by all countries, organisations, experts etc. In Indonesia, the most commonly used criteria are those set by the BKKBN, which are defined in Appendix 6. In addition to this data, more subjective perceptions were defined together with the villagers in three sample villages, Bone Baru, Monsongan and Panapat. The BKKBN data is shown in Figure 71.

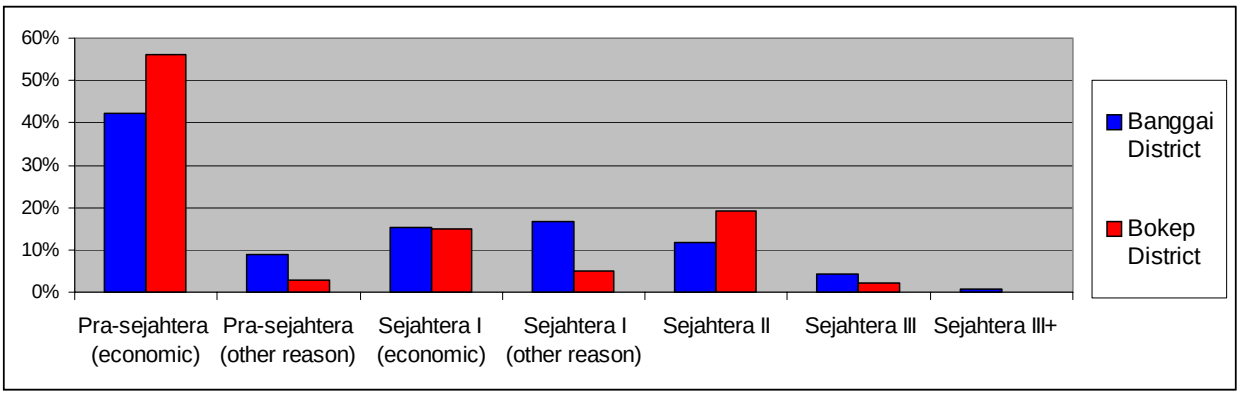


Figure 71 - Wealth/Welfare Categories for Study Area (BKKBN 2003 Data)

The village perceptions are given separately, with other relevant information pertinent to each village. Some other general points include:

- The ***Raskin*** Program: this is an aid program whereby cheap or reduced price rice is distributed to poor families. The implementing body, a government institution called ***Bulog,*** relies on BKKBN[2] figures for the Raskin programme. In Monsongan there are 199 registered poor families, however for some reason the ***Bulog*** decided only to acknowledge 39 of these, so under 20% of the supposed entitlement has been sent each time. This means the Village Head is in a no-win situation - whoever he helps, it is bound to cause bad feelings. He has tried collecting the rice over several months and then dividing a little to everyone, and also giving larger amounts to fewer people. Whichever way, he knows it is wrong, but as he said, what can he do? This situation was raised with the BKKBN. The reply was that the ***Bulog*** may not have enough to go round so that they cut the amounts, however Pak Bailia was surprised that only under 20% was distributed.
- Health service access: there are special programmes to enable the poorest people to access health care free or at very low cost. However, many people who qualify do not register, and many people who are poor in the eyes of most other people, do not qualify under the rules. Many people are ashamed to admit they are poor, or to go for treatment when they cannot pay. In addition, as throughout much of Sulawesi, there is a "false pride" (***gengsi***) syndrome, largely an effect of highly aggressive and successful brand marketing, of not wanting generic medicines (e.g. paracetamol) which are cheap or even free from the clinic, and preferring much more expensive (up to 10 times per dose) branded medicines (e.g. Paramex) from the ***kios***, even if they can't really afford them.
- The criteria can penalise people unfairly. For example, the family of Pak Guhudeng in Monsongan had a concrete brick house built buy his wastrel of a builder son-in-law. This is the only contribution ever made to the household, and is the result of stealing building materials from the project on which he was engaged. As a result, the family has no increase in income, but a permanent home means they and no longer qualify for government assistance for health, education and subsidised rice, though the Village Head has realised the problem and is trying to find a way he could be assisted, especially for the education of school-aged children and health care. This is not an isolated case, there are many "Pak Guhudengs" struggling to raise a family who find themselves worse off when they raise themselves up a little in one respect, without becoming rich enough to be self-sufficient.
- The above story also illustrates another point: the way that corruption has become a part of life at all levels. What is the difference between Pak Guhudeng's son-in-law feeling that a proportion of the materials he works with are his to take (and no-one in the village feels he did anything wrong) and the officials and contractors who feel it is their right to take percentage cuts from project money, or the officials who expect bribes in order to expedite what should be their normal work, such as producing routine letters? The new National Government has made a strong policy statement on KKN (corruption, collusion and nepotism), and the Regency Government officials also stated they are trying hard to reduce KKN, but it will be a long time before such deeply entrenched habits are eradicated.

Bone Baru

Perceptions of relative wealth in Bone Baru are shown in Table 31 below, however the people could not give numbers for each category. It was clear that very few villagers would qualify as Rich however, including the OFC, most of whom like the majority of fishermen live in wooden huts along the shore line, and therefore would come under the Poor category. The permanent and semi-permanent homes mainly belong to farmers and the small number of people with other

[2] All departments visited thing the BKKBN has the best available data on poverty and population - as Pak Bailia said, "dari A ke Z dikenal" - we know them [the poor families] from A to Z, including the names of each family head and all family members.

occupations. It is interesting to note that poor health and education are seen as a sign of poverty, and that a Television was actually the first item mentioned as showing someone was not poor.

Table 31 - Wealth Perception in Bone Baru

Poor	Medium	Rich
• Little education, often don't finish primary school • House built of planks (wood) • Poor health	• "Permanent" or "semi-permanent" house • Have some education (at least finished primary School) • Have a Television	• Have a plantation (over 500 clove trees) • Have transport (motorbike or car) • Have electric/electronic appliances (additional to TV)

Although the fishermen can give the cost of specific items none of them can give a true estimate of their "overheads". Other costs such as school fees, clothes, soap and other necessities as well as health care and other unpredictable expenses also have to be covered in order to provide a reasonable lifestyle. However a rough calculation done in Chapter 5 shows that even basic family necessities cannot be covered for IDR 800,000 per month.

Social Services: the new KD has arranged for Government help targeted at the elderly, in the form of coconut grating and rice husking machines, thus reducing the labour in preparing daily food, and also providing a potential source of income. The PLS - out of school education - is providing opportunities for the children whose parents cannot afford a formal education, and is also involved in social events such as preparations for the main religious festivals of this largely Muslim community. However the KD and BPD members feel that people do not pay enough attention to education, or take full advantage of the opportunities offered, something they feel is a great shame and are endeavouring to change.

Monsongan

Perceptions of relative wealth are shown in Table 32 below, however as in Bone Baru the people could not give numbers for each category. It was clear that very few villagers would qualify as Rich, although to do so only a few of the qualifiers would suffice. Most of the OFC like the majority of fishermen live in traditional stilted wood and bamboo huts, and have not continued past primary education (full/graduated or partial), therefore would come under the Poor category. Once again, although other criteria vary, a television was the first sign of increased wealth status to be mentioned. Note that even the poor are stated as "having enough to eat" - this means not hungry, but also few luxuries.

Table 32 - Wealth Perception in Monsongan

Poor	Medium	Rich
• Wooden house • Own a katinting or a "bodi" (one boat) • Have enough to eat • Low education (primary or even none)	• House built at least partly of cement based construction • Have a television • Educated (beyond primary level)	• Own a kios • Can go on Hadj • Have a plantation • Have a fridge • Permanent house • Good clothes • Own a compressor and several "bodi" (boats) • Graduated High School

However the local collector Hj Umrah did go on Hadj and has a permanent house, so would qualify for Rich. His household (5 people, with his wife and 3 children) has a monthly income of around 5 million Rupiah, some from farming but most from fisheries (***teripang*** and finfish). He owns a ***bodi*** with compressor and several ***sampan***, operated by 7 ***anak buah*** or regular (retained)

fishers. The majority of permanent and semi-permanent homes mainly belong to large farmers and the small number of people with other occupations, but some OFC do have permanent homes, such as Pak Guhudeng whose son-in-law is a builder (see Appendix 11).

Although income per fish has risen slightly over the years, sales have dropped, leading to a lower average income from OFC. Based on key informant and informal interview information, in other ways too life is harder. For example now only very small levels of credit can be had for buying basic items from the ***kios***, as there is no longer any security (rights over the catch) for the previously "financier" ***kios*** owners. Now the services of ***rentenir*** (loan sharks) are used more often. Often the only way to pay off debts, i.e. to get a big lump sum, is by destructive fishing (DF), especially the use of explosives, according to the ***kios*** owners to whom most fisher families are or were (until switching to ***rentenir***) in debt. So if this information is reliable, then DF and debt are intimately linked. Most fishing families are never out of debt, or only for a few days, according to the ***kios*** owners, from whom they buy most of their daily requirements.

Panapat

The wealth perceptions of the Panapat FGD are shown in Table 33. The signs of increased (medium rather than poor) status here are not consumer items as for the previous villages, but owning the means of earning a good livelihood, a farm/plantation or a ***katinting***, a motorised vessel to reach further fishing grounds.

Table 33 - Wealth Perception in Panapat

Poor	Medium	Rich
• Income insufficient (<IDR 500,000 per month) • No electricity • Sago leaf roofing and house in poor repair • Cannot afford to finish primary education • Sometimes break the law, especially stealing (mainly plantation produce)	• Own a ***Katinting*** or a ***bodi*** • Own a ***kebun*** - farm or plantation (small, if coconuts, 250 - 500 trees)	• Own a kios • Own many coconut trees • Own a clove plantation • Own a cocoa plantation • Own electronic goods • Have own electricity • Can go on Hadj

Education is only mentioned for the poor category. Poor people are seen as being more likely to break the law, especially petty thieving. The main target are cloves and coconuts according to the FGD. Note that poor families may also own a few coconut trees, often less than 100, but if over 250 trees were owned they would be considered Medium.

3.6.3.4. Gender Aspects

Gender roles depend quite heavily on the ethnic group of OFC families, as already mentioned. In Banggai ethnic groups, the trend is for more education and a greater role outside the home for women than was once the case, though not at sea. These women tend to spend much of their time arranging social events (a group activity) and many will work on any land owned by the family (though rarely doing the really heavy work) or as low-paid seasonal workers on other people's crops. The better off tend elaborate flower gardens or features as in Figure 72. and Appendix 7.

Figure 72 - Bone Baru Garden Feature

However the trend in Bajo society, once a society where gender had little influence on social roles and livelihood activities, is becoming more differentiated. This trend began when Bajo people started to settle in villages rather than roaming the seas, living on boats from birth to death. All Bajo children learn to swim early, often before they can walk (Figure 73), and to fish as soon as they can hold a small rod and line or mini spear.

Figure 73 - Bajo girls and boys at play together in the water

Traditional Bajo leaders consisted of elders who were either men or women, chosen for their aptitude by their predecessors and trained to take over the specific roles in their turn. This social order has all but disappeared, as under the Suharto regime it was suppressed for over 30 years. Now in most Bajo groups the traditional knowledge of the elders has been lost or is little valued.

The patriarchal nature of Indonesian Beaurocracy has reinforced the dominance of men in many social areas, because the KK (Kepala Keluarga) is automatically the senior man in a household, unless there is no adult male to take on this role. All aid programmes go to the KK, and the KK has to deal with most administrative business on behalf of the family. Now, modern ideas of fashion and beauty are also playing a role. Traditionally young Bajo girls and women would have gone to sea along with their male counterparts, and earned a similar living, thereby having financial independence.

A desirable mate in traditional society was a good fisherman or fisherwoman. Now girls feel they have to guard their complexions, to comply with the heavily advertised canons of "white (or at least pale) is beautiful" used to sell branded skin creams, soaps etc. Most are reluctant to go to sea, and although many older women still sell fish, like Pak Guhudeng's wife, many younger women, such as his three elder daughters, all quite capable of helping their parents, are no longer willing to do so, and dream of working in a shop, or becoming housewives, attracting a man well off enough to be able to provide for them. Many girls marry young, often marriage rather than lack of money for schooling is the reason for girls dropping out of education, whereas for boys it is more likely to be a chance of earning money.

Often girls accept the first offer that comes, especially if the prospective groom has paid work. An example is Pak Guhudeng's second daughter (the eldest just graduated High School). She left school with no qualifications to marry a building worker with a good income (by local standards) of IDR 30,000 a day. She now has a young baby, older than her youngest sibling (Figure 74).

In spite of the income from her husband (higher than her father's average earnings), she and now her child too are totally dependent on her parents. This is because her husband spends all his money on drink (although forbidden for Muslims) and cigarettes. Having no qualifications she cannot get a job that she would like, such as serving in a shop.

Figure 74 - Pak Guhudeng's wife & youngest child (front), married daughter & baby (behind)

Once again, the case of this family illustrates a number of wider trends. Poverty depends on how income is used, at least as much as income levels. Women often have little say in how money is used when they do not earn it. Without education, women find it hard to make a living, even

more so than men who can do quite well-paid unskilled work. Marriage as a way to securing a livelihood is not necessarily a safe option. Although this example is from a Bajo OFC family, similar tales could be found in other ethnic groups throughout the islands, and indeed throughout Sulawesi. Information below is from the FGD in the villages of Bone Baru and Monsongan.

Bone Baru

Women in Bone Baru rarely work outside the home, most could be described as housewives or "homemakers". However the roles they play in the village outside the home include:

- Some women take part in farming activities, including seasonal crops and long-term plantation care, though mostly only part-time or seasonally.
- Many take part in the women's group, PKK, including the weekly meetings which are held for reciting of the Holy Koran.
- Women work together for big events such as weddings, deaths etc.

Monsongan

Many women in Monsongan Bajo fisher families take part in fisheries related activities including capture fisheries, as in the traditional Bajo lifestyle, but are now also expected to full-fill the role of "housewife", now life is no longer lived on a boat but in settled homes, even if many are still over the sea and with few modern amenities.

- Women are more often the sellers of food fish than men, most ***Padola*** are women (Figure 75)
- Women frequently participate in OFC, generally with their husbands and other family members
- There is no fixed gender demarcation for almost all tasks within Bajo households
- One of the OFC local financier/collectors was a woman

Figure 75 - Monsongan Bajo woman (padola) taking fishery produce to market

5.6.4. Social Structure (Social Capital)

To some extent this has been covered in other sections, but this topic is explored in more detail below. Three aspects are covered, social relationships within the communities where OFC live, the administrative and legislative structure under which those communities function, and the framework of rules and regulations by which the OFT and the communities should abide.

5.6.4.1. Social relationships

Social relationships were explored through the construction of Venn diagrams in three villages, Bone Baru, Monsongan and Panapat. While there were difference, several general points of importance were similar, and are relevant to all villages visited:

- **Village Head & BPD:** the role of the Village Head is very important. Even when seen as "distant", he is seen as a key influence in people's lives. This is based on the traditional respect and the character and actions of the individuals involved more than a perception of the full potential role of the Village Head. Village Heads together with the elected BPD have considerable powers under OD - Regional Autonomy - including legislative as well as executive powers.
- **Lack of Outside Players:** in all villages, no outside organisations or individuals are seen as having a major role, not even the DKP, which in a fishing community should be seen as a key resource. The villages are still relatively isolated, with few higher level (above village

level) Government, NGO or private sector institutions having a major direct or perceived influence on people's lives.

- **Health, Education and Religion:** though the order of perceived importance varied (seemingly based mainly on the capacity and personality of the individuals representing these aspects), they were perceived as important by all communities, except in Monsongan the Imam/religion was not mentioned.
- **Official Community Organisations:** the official women's and youth groups (PKK and Karang Taruna) were of minor importance in OFC families lives, and seemingly in the villages generally. Once again this seems to be down to personalities as much as the actual structure. If they were taken over by really energetic and charismatic people with ideas that fired people's imaginations, they would probably become real community assets. Though no Venn diagram was constructed, the one exception was Tolikibit, where PKK seems active.

Bone Baru

Traditional social structures such as "***gotong royong***" are still very strong, and can be seen in the spirit of mutual help which pervades the village life, and is called on for organising communal tasks such as building/renovation/maintenance of religious and other public facilities, as well as the building of private houses. Most people are related, and family ties are very strong and important. Although quite a few young people are apparently unemployed, according to the FGD, there is no unruliness or drunkenness. The FGD participants said people were "***sadar***" which means conscious - and didn't want to make trouble. These unemployed young people who have left school live off their parents income, something which is accepted.

A Venn Diagram was also constructed during the FGD, which is shown in Figure 76. This shows the Village Head (KD) together with the BPD, the elected Village Council, as being the most influential and closest to the people, while the local youth group (Karang Taruna) was the furthest, because it's activities are largely purely social and within the membership, with little impact on the village as a whole.

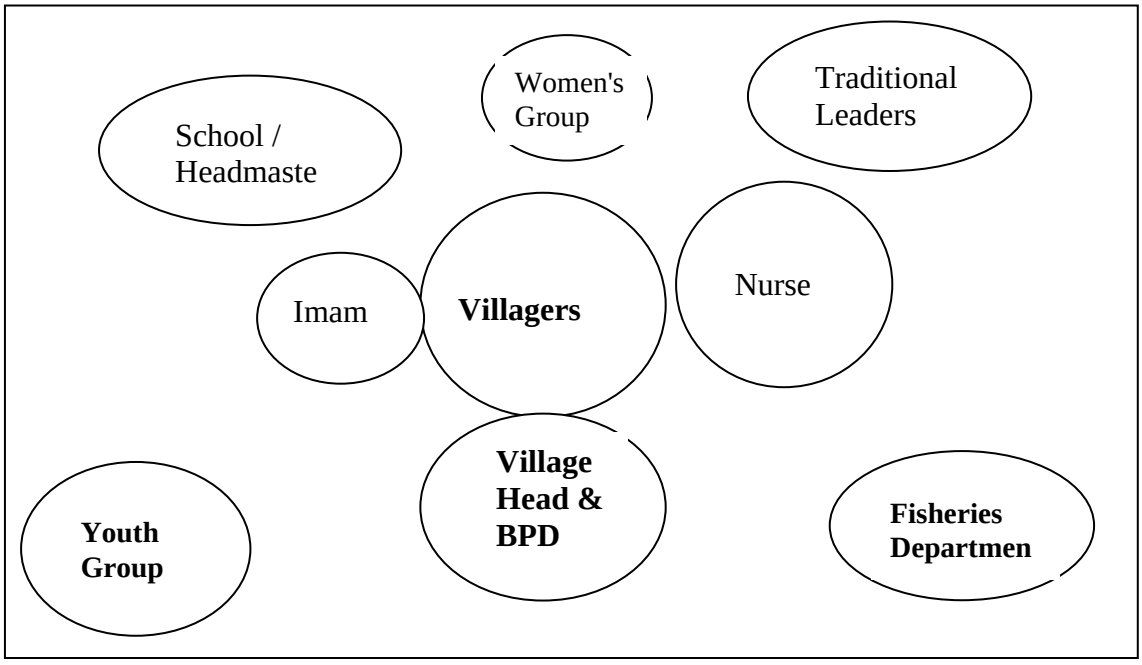


Figure 76 – Venn Diagram Bone Baru

After Pak Samsudin S. Hamid the KD, Pak Abdul Rahman the head of the BPD was one of the most respected and influential "***tokoh kunci***" or key local leaders according to the FGD. The Imam/religion were seen as being equally close with the Village head and BPD but of lesser

impact than them or than the village nurse. The village nurse/health care is seen as important and the third closest.

The women's group (PKK) is relatively close (fourth) but plays a minor role, largely limited to weekly readings of the Holy Koran. The School, Headmaster and education generally are seen as important but not particularly close, as there is little interaction other than the provision of formal education, however the Headmaster is very respected, on a par with the Village Head.

The fisheries department (Dinas Perikanan) and Traditional leaders (***Tokoh Adat***) were seen as potentially important but distant. The ***Tokoh Adat*** have lost a lot of their traditional roles, such as in judicial matters, but are still important in receiving honoured guests and carrying out traditional ceremonial roles. The Dinas Perikanan is seen as having little influence on or interaction with daily life, and fisheries officers have never come to carry out extension activities in Bone Baru. However the fisheries were seen as being active in two ways: (i) facilitating the OF trade by allowing (facilitating) the Tumbak buyers to visit the Village, and (ii) the construction of the BBI or hatchery in a Dusun or sub-village of Bone Baru.

Monsongan

Most people are related, and family ties are very strong and important, and most people marry within the wider family. Traditional social structures such as "gotong royong" are still very strong, and people work together on major undertakings such as building houses or major events. Most Bajo fisherfolk houses are inhabited by 2 or 3 households, most often of different generations (e.g. parents and married children, or even grandchildren). For example, one OF collector lived with his parents, together with grandparents, a married sister with her husband and child, and his younger siblings.

A Venn Diagram was also constructed during the FGD, which is shown in Figure 77. This shows the Village Nurse who is also a midwife as being the closest and most important to the community. She is a very approachable person, whom people trust and feel comfortable with, and her services a highly valued.

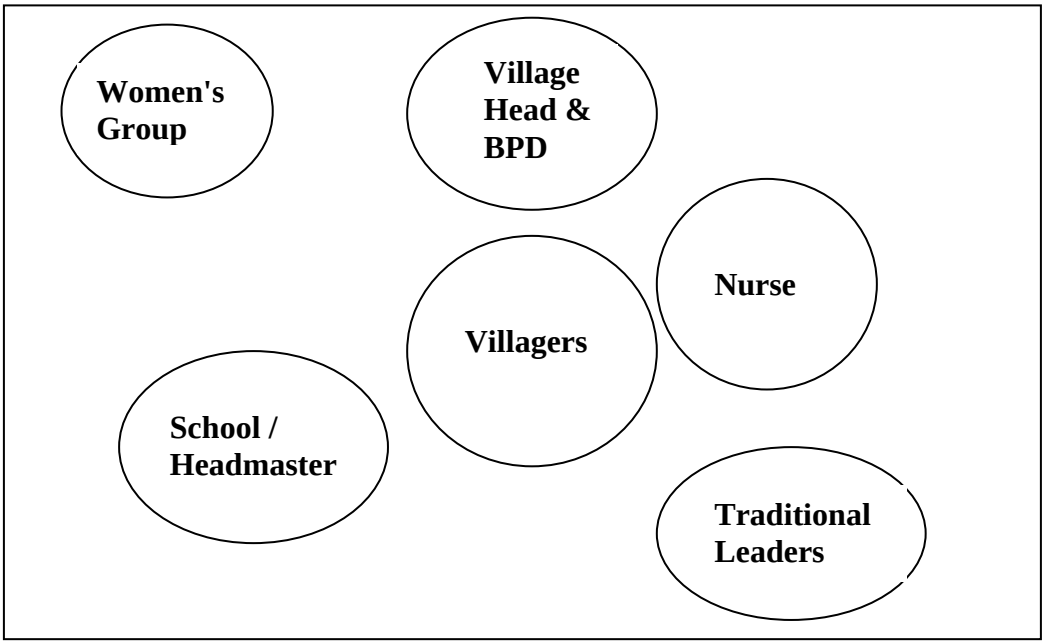


Figure 77 - Venn Diagram Monsongan

The Village Head (KD) together with the BPD, the elected Village Council, and the School/education as being about equally second in importance, however they are not felt to be close, the word used for the relationship was ***segan*** which means that the villagers feel at once

respectful and wary or even somewhat intimidated. The KD was said to encourage and assist OFC activities, though in what way was not clear.

Traditional leaders (Tokoh Adat) were seen as potentially important but distant, and the word ***segan*** was also used in connection with these traditional leaders, who still inspire respect but have little influence on daily life now. The community is less and less concerned with the traditional ways, in which the Tokoh Adat used to play a central role, and is increasingly "modern" (the word used by the villagers).

The women's group (PKK) is the most distant, not because of any social barriers but because the organisation (which has to be set up in every village, organising is usually the task of the Village Head's wife or the wife of a major leader) has no real activities, so it is felt to be quite useless and irrelevant.

Some organisations or individuals mentioned in other villages did not appear in this case. Particularly noticeable by their absence are the Imam/religion, the local youth group (Karang Taruna) and the Fisheries department (DKP). Respondents did however mention that the Fisheries Department did carry out "sosialisasi" (socialisation?) about the BCF, stressing the uniqueness of this species, and that therefore capture should be limited. But according to the FGD participants, the DKP had never given any practical advice (extension) or assistance.

Panapat

A venn diagram was also constructed during the FGD, which is shown in Figure 78. This shows the Village Head as being the most influential and closest to the people, while the local youth group (Karang Taruna), women's group (PKK) and the fisheries department (Dinas Perikanan) were seen having little influence or interaction. The School (teachers/headmaster) and education generally, the village nurse/health care, and the Imam/religion were seen as being intermediate, important but having less immediate impact on daily lives/livelihoods than the Village head.

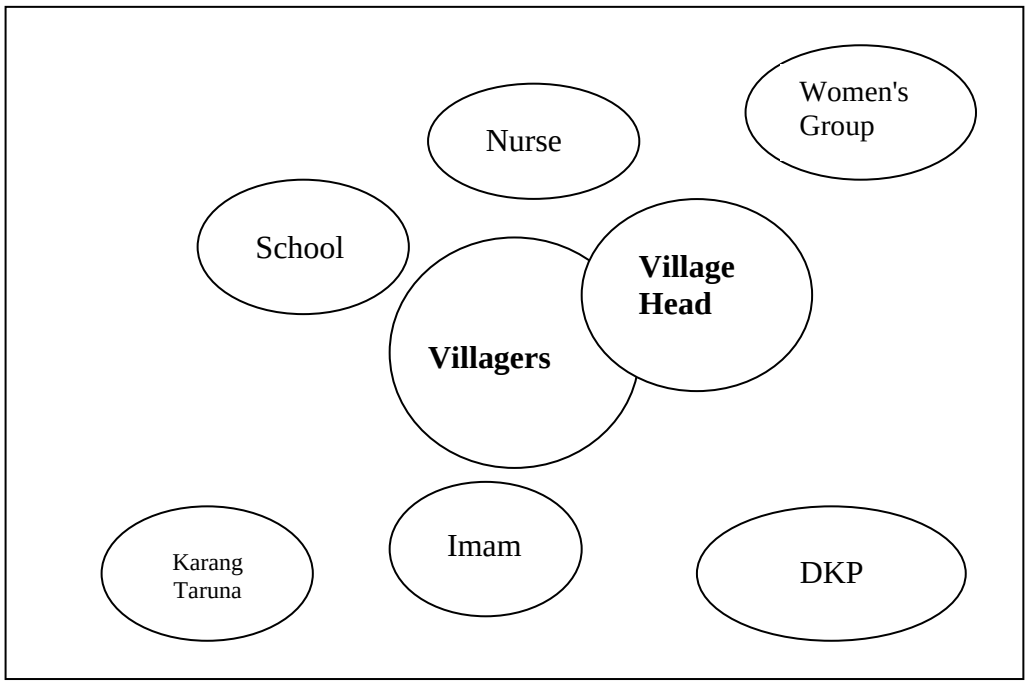


Figure 78 – Venn Diagram Panapat

3.6.4.2. Administrative & Legislative Structure

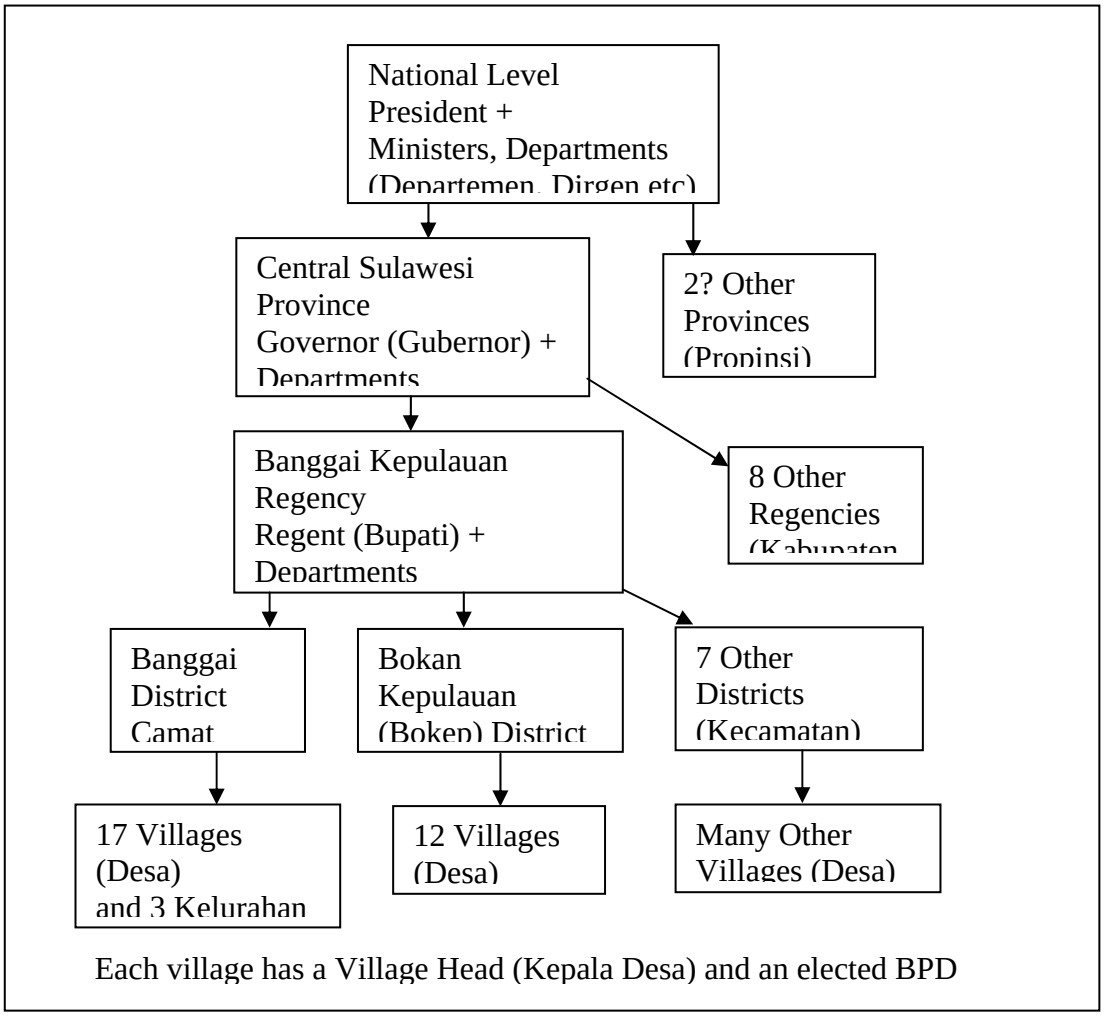


Figure 79 - Administrative Structure from National to Village Level

The key administrative structures are shown in Figure 79. Note that a village (Desa) has an elected village head and village assembly, whereas a Keluruhan (suburb) in a town only has a Lurah, who is an appointed carer civil servant. The levels with elected assemblies with legislative powers are shown in Figure 80, together with territorial limits of jurisdiction on land and at sea.

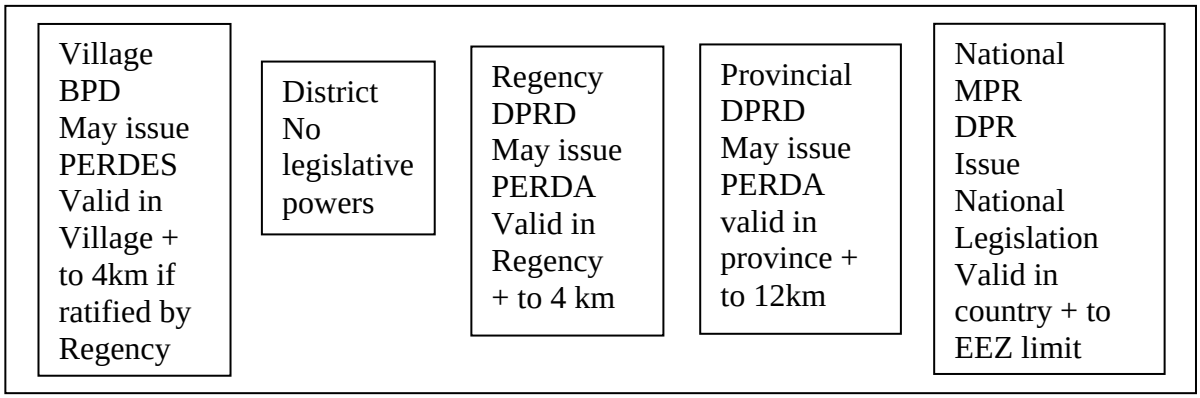


Figure 80 - Legislative Assemblies and Extent of Jurisdiction

3.6.4.3 Current Regulatory Framework

The current regulatory framework is outlined in Table 34, but does not claim to be a complete description or listing of the regulatory framework in place, merely an overview of key points of relevance to the OFT, as they should operate according to key informants. An indication of the state of compliance is given in Table 35.

Table 34 - Regulatory Framework for OFT in Banggai Kepulauan

OFT Level/Activity	Regulatory/ Enforcement Body	Regulation Type/Activities
Capture	DKP Regency Level	Licensing (larger fishing vessels, gear, etc) Recording (small fishing vessels, gear, etc) Recording and collection of dues on fisheries catch Surveillance, Socialisation and (limited) Enforcement of all Fishing Regulations, including DF Reporting offences to the law enforcers (Police)
	Police (sometimes also Navy)	Enforcement of national law (bomb and cyanide use, coral mining, etc) and established local laws
	Kelompok Wasmas (village wardens trained by DKP)	Surveillance and Reporting to DKP/Police If PERDES are ratified, enforcement of PERDES
Capture & Trading	Perhubungan Regency to National levels	Registration of larger vessels (KM), usually vessels with inboard motors, most over 2 tonnes require registration
	BKDSA	Capture and trade in Endangered species
Trading	Koperindag Regency to national levels	Business and trading Licences - all traders should be licensed, including sole traders (individuals) Recording and collecting dues on all transactions Compliance with standards
	Karantina (Fish quarantine) in Luwuk (and beyond)	Verification of fish health and compliance with standards (species/trade dependent) Issuance of quarantine certificate to specific destination (in-country level). All fish leaving the area (alive or dead/processed) should have a certificate.

Table 35 - Compliance Levels in 2004

Institution	Level of Implementation of Regulatory Role
DKP (Marine & Fisheries Department)	No application to the OFT as yet
Koperindag (Trade and Industry Department)	No application to the OFT as yet
Karantina (Fish Quarantine)	No presence in Bangkep
Police	Little attention to marine matters
Navy	No permanent presence in Bangkep (occasional staff only assistance for surveillance, no vessel)
BKSDA (Conservation Department)	No presence in Bangkep
Perhubungan (Department of Transport)	Many vessels unregistered or illegally operating in Bangkep waters, no action to date
Kelompok Wasmas (Village Wardens)	In process of being established, little power until PERDA are drawn up and ratified

In practice most of these regulations/systems are not (yet) applied, for example the Karantina and BKSDA have no presence in Bangkep, and the Karantina has never yet issued a certificate for fish leaving the area by sea. No OFT traders are registered properly with the Trade and Industry Department (Koperindag). Fisheries licensing, surveillance and recording is still minimal. A brief summary of the current situation with regard to implementation of this framework by institution is given below:

In addition to general national legislation (UU - ***Undang Undang***), there are many rules and regulations issued by various departments which people and organisations undertaking specific activities must comply with. The roles of some organisations have been covered in more detail in Chapter 4 and Appendix 11.

One basic principle of law is that no legislation may conflict with legislation passed at a higher level. Therefore all local laws have to be in accordance with national laws, and local laws at higher levels. In theory national laws should comply with International laws and treaties to which Indonesia is a signatory.

The national legislation includes laws banning most destructive fishing practices, and as Indonesia is a signatory to the Biodiversity Treaty and Agenda 21, the CITES agreements and other International treaties regarding sustainable resource use of natural resources and conservation (RAMSAR, the Kyoto Protocol etc), all levels of legislation must comply also with the provisions of these treaties.

3.7. Discussion and Recommendations

In view of the data and information gathered during the course of this study, it is felt that there are many problems with the current status of the international trade in ornamental fish from Indonesia. Some are specific to particular areas or species, some are more general. Many impact of the welfare of poor people and/or threaten the sustainability of the trade and therefore people's livelihoods. The main issues and potential solutions are discussed. A number of recommendations for action and further study are given.

3.7.1 Discussion

The discussion is divided into three areas, issues raised during each of the case studies, and more general or global issues that were part of the background briefing to the teams and/or became apparent during the work. The issues raised during the Banggai case Study can be divided into two main groups, issues related to the resource base and local capacity at all levels, and issues related to the interaction between people, during the collection and trading processes. Each of these is considered separately in the following sections, though in some cases there are close connections between various issues.

3.7.1.1. Resource Aspects: Natural Resource Base and Local Capacity

The ornamental fish resource base is finite and the current exploitation methods and/or levels do not seem sustainable. In general these threats are related to poor existing capacity for resource management. Improving resource management will require above all major capacity building in terms of human resources (skills and knowledge) at all levels and in a variety of fields. In addition equipment and infrastructure are minimal and will need upgrading.

Major positive resources available locally include the fishery high schools (Chapter 4), the Tertiary institutes in Palu with Marine/Fisheries programmes, particularly the STPL which is totally dedicated to this sector (Chapter 4), marine oriented NGOs such as YPH, and the Regency Marine and Fisheries Department (DKP). The Regency DKP has a major asset in the facilities which will be available at the hatchery (BBI, see Bone Baru Profile, Chapter 3), though

substantial internal capacity building will be necessary first for taking full advantage of this potential resource and for many other aspects (Chapter 4 and Appendix 11). Provincial and National level DKP can also make substantial contributions, as can national and international NGOs such as MAC, Reef Check Foundation, TNC (MPA training programme), and others. These activities will require funds and other resources for which sources must be found, in-country and internationally.

Habitat destruction

The OFT depends on a steady supply of fish, which will not be available from the wild if their habitat is destroyed or damaged. Therefore ornamental fish habitat conservation is of prime importance to sustainability of the OFT and to any long-term poverty reduction through improvements in this trade.

The activities resulting in habitat destruction have been described in Chapters 5 and 6. People while engaged in OF are often both perpetrators (e.g. cyanide fishing, mechanical damage etc) and victims of the actions of other groups (e.g. bomb fishing, coral mining, sedimentation). The same people may be involved in different activities at different stages of their lives, in different seasons, or depending on immediate opportunity or need. Clearly this issue cannot be considered as a purely OFT matter but as part of wider coastal and marine resource management involving the whole community.

Reasons for illegal activities and enforcement aspects are discussed under a special section. However in many cases destruction is caused by people who "don't know any better" - they do not understand the implication of their actions or do not have the skills to use less damaging methods. Sometimes it is a question of economics and availability of infrastructure, as in coral mining, where coral rock (often live massive corals) is free for the taking, and can be brought easily by boat to the place of use but rock which can be quarried on land (a plentiful resource in Bangkep) usually has to be paid for - and transport is often very difficult to arrange, as can be seen from the infrastructure sections in the village profiles (Chapter 3) and in Appendix 5. In general, three main reasons/causes for damaging behaviour can be identified:

- Deliberate use of or encouragement of illegal practices through need or greed
- Ignorance, lack of skills or lack of infrastructure
- Laziness (taking the easiest option)

To address these issues education is a key factor, to make the whole community aware of the damaging impacts for the long-term wellbeing of all people who depend on or use (e.g. as a source of protein) marine resources, not just fishers themselves. This will make these practices socially unacceptable, whereas at present they are accepted by most people as part of life.

Formal education systems, use of "mass media" (especially the very active local radio) and awareness campaigns using (simple and highly visual) printed materials or other items (e.g. T-shirts, stickers), which can be associated with simple actions (such as beach clean-ups, drawing competitions etc) are all options for putting across the message. All levels of formal schooling now include a ***muatan lokal*** (local content) subject in their curriculum. In Bangkep there is no specific material yet available for this, which is a great opportunity for reaching most households through the most easily influenced members, the (especially primary) school-age children. The fishery high schools (see Chapter 4) are a major potential asset, as after graduation most of these young people will return to their communities as part of the educated minority and will be local leadership candidates. If given the proper grounding they will become community leaders in sustainable marine resource management.

More specific capacity building in terms of human resources (skills and knowledge) and where appropriate equipment and infrastructure is required, to promote "best practices" and offer viable

alternatives to unacceptable activities or methods. In this respect, the fishery high schools are a major asset, as are the Tertiary institutes in Palu with Marine/Fisheries programmes, particularly the STPL which is totally dedicated to this sector (see Chapter 4). The Regency Marine and Fisheries department, especially through the facilities which will be available at the hatchery (BBI - see Bone Baru Profile, Chapter 3), can also play a leading role.

Overfishing

Overfishing automatically means unsustainable. Unless this can be avoided or corrected, any livelihood improvements based on other improvements in the OFT will at best be transient.

Overfishing occurs at various life-stages for various species. For most species traded in the OFT, the only information was that fish are now harder to find or require longer journeys. More data was available for the Banggai Cardinalfish ***Pterapogon kauderni*** (BCF). In some cases collecting a certain number at the same location takes longer, or in technical terms CPUE (catch per unit of effort) has diminished (e.g. BCF in Bone Baru and Monsongan). In other cases, new fishing grounds have to be sought or fisheries have ceased as previous locations are no longer sufficiently productive to make fishing viable (e.g. BCF in Tinakin Laut), and in extreme cases local extinction is a real threat (e.g. BCF around the Liang Islands). However it seems these scenarios are not limited to this species, and a pattern of over-fishing and moving on is prevalent in the OFT as in the LRFT.

In addition to species fished only for the ornamental trade, a number of species which are already heavily exploited in other life-history stages as food fish are also targeted while in the juvenile phase for the OFT. These include various grouper species (Serranidae), sweetlips (Haemulidae), snapper (Lutjanidae), barramundi cod (*Cromileptes altivelis*) and the Napoleon wrasse (*Cheilinus undulatus*). Although Serranidae, Haemulidae and Lutjanidae do not seem to be targted for the OFT by Banggai fishers, juvenile fish of these species were seen in the Bali exporters tanks, and according to staff there some, especially Serranidae, are from Sulawesi, very possibly from Bangkep. The Tumbak buyers said they buy *Cromileptes altivelis* (locally called ***kerapu tikus***) and *Cheilinus undulatus* (locally called ***ikan maming*** or ***ikan napoleon***) from Banggai fishers for the OFT as juveniles.

These species are already known to be over-fished in adult or (especially *Cheilinus undulatus*) older juvenile stages. Many are caught for the LRFT but also (especially Lutjanidae and Haemulidae) as local food fish. Juveniles are also frequently targeted for grow-out to marketable size in the LRFT. Inclusion in the OFT of these juveniles increases pressure on already diminished and in some cases potentially threatened[3] stocks. Many will fast out-grow the average aquarium. Cyanide is often used to catch these fish at all sizes.

In addition of application of limited existing regulations, better stock and catch data is needed to design and implement fishery management measures for both identifiable single species (e.g. BCF) and more general multi-species ornamental fisheries. This data collection (baseline data and monitoring) will require significant capacity building at the local (Provincial and Regency) levels as well as equipment, infrastructure and operational funds. For BCF, research on the effects of various types and intensities of fisheries pressure has been initiated by researchers (Kolm & Berglund 2003). Further work on this aspect is being planned by YPH and STPL in conjunction with the Provincial Marine and Fisheries Department in collaboration with Dr Kolm, though resources would be insufficient to complete this work without outside assistance (also being sought).

Likely fisheries management measures (to be enshrined in appropriate PERDA/PERDES) include protection (no-take areas) of particularly vulnerable habitat (e.g. known spawning grounds of some species, some already identified but not given in this report as the information

[3] http:www.hku.hk/ecology/GroupersWrasses/iucnsg/index.htm

is highly sensitive) or areas to function as breeding reserves; closed seasons or rotation cycles; limits on numbers of fishers/gear and on equipment types; in-situ breeding for the BCF, zoning for specific uses, etc. Establishing these would be part of a wider programme of developing a network of locally managed marine areas (LMMA) throughout Bangkep.

Poor Fishing Practices and Post-harvest Handling

The OFT buyers generally only accept fish in prime condition, especially without any signs of physical damage such as missing scales, damaged fins, wounds, etc. For some species size is also a consideration, and some also have requirements which can be hard to meet in captivity (e.g. special food, water quality etc). Rejected fish mean the loss to the reef is also a loss to fishermen. Mortality at whatever stage of the chain generally contributes to higher costs, low prices for the poorer people low in the trade chain, and to overfishing on the reef. Reduction of rejection and mortality levels are key points in achieving sustainability and seeking to improve the livelihoods of the fishers and other poor people involved (Rubec & Cruz 2005, Wabnitz et al 2003, Schmidt & Kunzman 2005).

Many fish caught in Bangkep are damaged or die during capture or post-harvest handling and mortality is high, both before (this study, Lunn & Moreau 2001&2004, Kolm & Berglund 2003) and after (this study, Moore 1999) leaving the Banggai Kepulauan area. This contributes to overfishing (to replace losses) in Bangkep and is a major reason (or excuse) for low prices paid at lower trade levels in Bangkep and at intermediary levels such as in Tumbak (this study, Lunn & Moreau 2001&2004). Improving these practices would contribute to achieving sustainability and should result in improvements of financial returns at many levels, including increased incomes and reduced effort for the collectors and in some cases intermediaries who are currently living in poverty for at least some of the time (poor or at risk).

The current skill and equipment levels are particularly poor at the lower trade levels including specifically in Banggai Kepulauan fishing communities. In some cases, simple changes in post-harvest handling procedures could significantly reduce rejection and improve survival. For example, with BCF, better on-site selection, releasing juveniles, larger mature adults and brooding males immediately after capture, would reduce both rejections and mortality significantly and is already practised by some OFC.

Better care during ornamental fish holding (in Bangkep and beyond) is also an issue, for example establishing and implementing suitable feeding regimes at village holding sites. In some cases research and experience on realistic improvements is available, especially at higher market chain facilities (e.g. Schmidt & Kunzmann 2005). In others, especially for low-tech village-level operations, more adaptive research is needed (including trials involving local communities) to make current academic research applicable in the field, for example for longer-term BCF holding (Kolm, personal communication, Vagelli personal communication). It is also clear that care during transport is not yet optimal.

The chemicals and other additives (oxygen, antibiotics, antifungal agents, buffering agents etc) which can be used for significantly improving survival of fish in transport are not always ideal or used in proper concentrations (Schmidt & Kunzmann 2005), and latest research in this area needs to be communicated and applied.

In other cases, equipment is an issue, for example the coarse nets used by many OFC cause significant levels of scale and fin damage, often leading to death from infections and/or rejection by buyers. The use of cyanide is still rife (this study), with well-known damaging effects on fish health (Rubec & Cruz 2005).

In all these cases and many others, training in new skills and investment in appropriate equipment are required. Local regulations (PERDA/PERDES) can be powerful tools for

supporting changes in capture and handling methods and gear, but cannot work without the improvements in skills and other resources to enable compliance.

Local organisations (academic, NGO, Government) mentioned above and can work together with acknowledged experts such as people trained by MAC and IMA in improved fishing and handling techniques, researchers such as Dr Kolm and Dr Vagelli, all levels of DKP and other resource persons and/or organisations to improve the capacity of stakeholders directly involved in the OFT (fishers, traders etc).

Illegal Practices and Lack of Law Enforcement

Enforcement is often seen as an item which should not be necessary if education and awareness programmes have done their job. However in the real world there are always people who will take advantage of weakness, and enforcement is vital to protect the interests of those who cannot protect themselves, such as poor coastal people dependent on marine resources. The importance of this issue was heavily stressed at the 2nd ITMEMS (International Tropical Ecosystems Management Symposium) in Manila in 2002 and a special session chaired by Dr Mark Erdmann was devoted to this subject, which co-author of this report Abigail Moore attended. At the closing ceremony all delegates agreed to a motion recommending that this issue be given prominence and requesting support from donor organisations for effective enforcement, on the premise that without effective enforcement of regulations, all other conservation and sustainability measures will fail.

Enforcement requires a desire on the part of the majority of the population to comply. Without this support, no regulation can be enforced to a meaningful degree. If people understand why a regulation exists, and have the means of complying with it, both in terms of direct capability (e.g. a rule to use fine mesh nets cannot be enforced if there are no fine mesh nets available) and sometimes in alternative livelihood options or improved life-skills (e.g. a way to pay off large debts other than bomb fishing - or to avoid getting into debt in the first place).

Once this support has been achieved, enforcement can then concentrate on the minority who still wish (usually through greed or laziness, sometimes from misplaced pride/showing off) to act in defiance of the law.

As many of the activities which degrade the underwater resources in the Banggai Archipelago are clearly illegal, proper enforcement of legislation would go a long way towards reducing the scale and severity of resource degradation. Destructive activities clearly identified which are not yet illegal should be made so, through appropriate local legislation. It is worth noting here that many people engaged in illegal activities do so because of orders or pressure from more powerful people (economically and/or politically), and with the support and/or connivance of people who are definitely aware of the illegal and damaging nature of the activities. Recent changes in legislation make it possible though not easy to indict such major players as well as the "small fry" who until now have been the only "stakeholders" which the legal system has been able to process. The new legislation is quite tough but still often unclear when applied to specific less well-known situations such as ornamental fishing.

In respect of Banggai Kepulauan, the fisheries surveillance and enforcement department consists of one person and very limited operational equipment, e.g. no radio communications and partial use of one small speedboat. There is no naval base, and the Luwuk base and no naval vessels based elsewhere operate regularly in this area. Therefore community involvement (Appendix 11) is felt by DKP staff to be the only realistic option for most aspects of fisheries legislation. PERDES village level regulations would give trained community wardens the right to arrest people committing relatively minor infringements and give the elected village assembly (BPD) the right to process them, though major infractions would still need to go through the full standard national legal process.

The general law enforcement personnel (police, judges, lawyers etc) by and large have very limited knowledge of environmental and natural resource use law or the reasons for and importance of such legislation. They tend to think of them as unimportant compared to say theft or rape, and in some cases law enforcement personnel are actually involved in infractions (e.g. protecting operations) or collude (e.g. through accepting bribes).

There needs to be a major effort to improve law enforcement in Banggai Kepulauan and in some cases to improve the legislation, especially at local levels. PERDA and PERDES provide very wide scope for improving the relevancy of legislation to the OFT and for providing mechanisms whereby basic legal principles can be applied in practice. Community members need to understand legislation and be empowered where appropriate to assist in enforcing it. Such a system would deal with most local-based infractions.

However, a substantial number of infractions relating to the OFT are committed by people and vessels from outside the area, who often do not report, and who often have superior resources to local villagers, e.g. faster vessels, sometimes armed or willing to defend themselves with bombs. To deal with these, local communities can only realistically assist with surveillance and reporting, which will be one of the roles of the "wasmas" system being developed. To back this up, the capacity of the Government law enforcement system needs to be improved, in terms of numbers and knowledge/skill levels of staff and of operational resources (equipment and funds). The Regency does not have the financial resource base or the human resources for such a task, so assistance from higher levels (National and even International) is essential if this important aspect, vital to the sustainability of local livelihoods, is to be addressed.

Attention to legal aspects higher up the trade chain, both within the country and abroad in transit and importing countries is clearly also vital. However detailed comments on this aspect at the international level are beyond the scope of this case study and the fields of expertise of the team members.

Protected species - a special case

The inclusion of the Napoleon wrasse[4] *Cheilinus undulatus* in the OFT is clearly illegal, as this species which already comes under National legislation (forbidding the trade in individuals under 1kg or over 3 kg in weight) has been officially listed in Appendix II of CITES[5] (Convention on International Trade in Endangered Species) at the October 2004 Convention of the Parties in Bangkok (Sadovy 2005). The listing comes into force in January 2005 and states:
"The export of any specimen of a species included in Appendix II shall require the prior grant and presentation of an export permit. An export permit shall only be granted when the following conditions have been met: (a) Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species; (b) Management Authority of the State of export is satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora; and (c) Management Authority of the State of export is satisfied that any living specimen will be so prepared and shipped as to minimise the risk of injury, damage to health or cruel treatment. International trade in specimens of Appendix-II species may be authorised by the granting of an export permit or re-export certificate; no import permit is necessary (but imports must be accompanied by export/re-export documentation)" (Sadovy 2005).

[4] *Cheilinus undulatus* is not the only protected species illegally fished or traded in Bangkep, but is the only protected species known to be traded in the OFT from this Archipelago. Other marine protected species illegally fished and traded according to field data, often by local OFC as an additional livelihood activity as well as by other fishers and traders, include the green turtle (*Chelonia mydas*) for eggs and meat, the hawksbill turtle (*Eretmochelys imbricata*) for eggs and shell, all 6 species of Tridacna clams mainly for their meat, and (though rarely) the dugong (*Dugong dugon*), mainly for the tusks though the meat and skin also have value.

[5] Information is available on the internet at www.scrfa.org, www.humphead.org and www.CITES.org

Clearly Indonesia has a duty to enforce this rule, which will not be an easy task, as there is no sustainable fishery for this species and those involved in the trade are mainly wealthy influential people who are used to avoiding or flouting the law with impunity. However without international action, especially on the part of countries acting as transit points or as importers, unilateral action is unlikely to be effective.

3.7.1.2. Social Aspects: Related to Collection, Trade and General Livelihoods

Social factors are of course a major factor determining sustainability of the OFT and the livelihoods of those involved in it. In Bangkep, there are many social problems in both the collection (fishing) and trading stages of the OFT. The summary below is translated and adapted from a summary presented at both the post-survey stakeholder meetings (Appendix 14) , and which at the Banggai meeting was confirmed as being substantially in-line with stakeholder perceptions. Unlike the objective nature of the previous section, this section is much more subjective, and stakeholder perceptions are an important part of the picture.

Collection/Collectors

- Ornamental fishers in Bangkep are rarely 100% dependent on OF as a livelihood activity, but for most OFC it is an important part of their livelihood strategy
- Most OFC involved in BCF collection are among the poorer fishermen because this fishery does not require expensive equipment or supplies
- Fishers agree that methods used are often damaging to the environment and that handling at all stages could be improved. They are mostly keen to improve their skills but some were honest enough to add only as long as any changes were not too onerous in terms of effort or cost. Some known improvements (e.g. fine nets) are not available for sale in Bangkep.
- Fishers feel that there is no effective law enforcement. Most want the law enforced on others, especially outside fishers, but not all are so keen on enforcement within their own community group, at least unless there are real and perceived benefits to themselves, in the immediate as well as longer term, and above all unless the laws are applied fairly. There is a widespread conception that the law is for sale and that the infamous trio ***KKN*** (collusion, corruption and nepotism) so reviled at the downfall of President Suharto and his "New Order", is still alive and well.
- There is considerable potential for "horizontal" conflict between groups of fishers, to some extent within fishing villages and between villages, but above all between locals and outside fishers often viewed as "thieves" because they act without respecting proper traditional reporting procedures as well as usually outside the law.
- Fishers are in generally poorly organised, and have little or no access to "proper" credit facilities for improving their equipment (as well as for family needs). They have no collateral or knowledge of how to approach lenders. They also generally have very poor business management skills, including simple money management and budgeting.
- Destructive fishing is often driven by debt and/or ties to powerful people who organise the activities, including supplying the equipment and materials. Other fishing is also often much determined by similar power relationships.
- Most fishers have limited education, and this needs to be taken into account in any training, awareness and other interventions

Trade/Traders and Trading relationships

- Fishers in Bangkep are dependent on a limited number of often irregular buyers. They have no direct access to the national/international marketplace or to accurate information regarding the value of the species they catch. Most OFC perceive the marketing aspect as the

biggest problem in OF, rather than the collection activity. More regular, predictable market access and better prices are their two main aspirations.

- Communication is difficult, so orders cannot be placed until buyers arrive. Uncertainty over orders often results in over-fishing and high mortality in holding.
- There is mistrust between some fishers and some buyers (suspicion of miscounting fish, cases of broken promises both ways).
- Payments from buyers to fishers are sometimes delayed or even not made. Similar problems sometimes arise between buyer levels.
- Equipment and supplies for packing and transport are at present only accessible to the buyers, not to fishers (or potential fisher groups), and efforts are made to keep it this way.
- Lack of organisation and information mean that fishers have a very poor bargaining position. There seems to be little competition between buyers which might make the fishers position stronger.
- The buyers coming to Bangkep are often themselves only minor players, with low margins and little bargaining power with buyers higher up the chain.
- Mortality is excessive but seems to be used as a reason for low prices even beyond what would be reasonable. Since 2001, mortality has reduced somewhat and general retail prices have risen considerably, however prices per fish in Bangkep have remained largely static.
- Proper procedures and dues are rarely if ever followed/paid.

General Livelihoods

- Poverty is often at least as much due to poor money management skills as it is to low annual income. Most OFC families (indeed most fishing families) have irregular incomes, and tend to spend in good times without making proper provision for predictable lean times, which if they think about it they know are bound to come every year, or for irregular events such as accidents, illness, repair of equipment etc.
- Wider family and community ties are very important in coping with major events such as weddings, deaths, house building or acute sickness. However there is no structure for co-operation on a regular basis, such as self-help groups (Anonymous 2004b), co-operatives or other community organisations.
- Different ethnic groups such as Bajo and Banggai traditionally have very different family/gender role allocations, livelihood priorities and non-OFT related livelihood activities, all of which need to be considered. However there is a tendency for younger people to move towards a more homogenous, "modern" lifestyle.

3.7.1.3 National and Global Aspects

- National action is urgently needed to address the problems associated with OFC operating outside their base areas (in different Regencies/Provinces).
- Information on advances in OFT-related technology and knowledge are hard to obtain. They need to be widely communicated in digestible format, including translation into simple Indonesian language and dissemination to potential users, to people and institutes engaged in related education and training - and where appropriate (e.g. for legislation drafting) to relevant decision makers.

- Some internationally proposed conservation measures (e.g. listing of ***Pterapogon kauderni*** as an endangered species) could cause hardship in poor communities without necessarily achieving conservation objectives.
- Application of strict import regulations (e.g. requiring certification) at this stage, without first assisting local OFC to cope with such systems will increase poverty as the larger operators can more easily comply, and pass on costs to those least able to defend themselves - fishers and small intermediate buyers.
- Resources at the levels where action is needed are not sufficient for communities and autonomous Regencies to "put their house in order" by themselves. National and International assistance is badly needed to assist with programmes to improve the OFT, especially at the two levels at which regional autonomy really is designed to work, that is the Desa (village) and Kabupaten (regency) levels. In particular, assistance for PERDA/PERDES design and implementation, but also many more aspects (see 7.2 Recommendations).
- Data is hard to obtain on the real levels of international trade, though for the short period for which it ran, the GMAD database provides much pertinent data and information. Most available statistics do not give sufficient detail (e.g. FAO) and/or are of insufficient reliability (e.g. Indonesian Government statistics).

3. 7.1.4 Resume of Major points

- The trade in its current form is ecologically unsustainable, but in general (with some exceptions) could be operated in a sustainable form
- Although the trade does not generally directly cause poverty, it does not contribute significantly either directly or indirectly to poverty alleviation whereas it has the potential to do so if better regulated to benefit all stakeholders
- Positive actions to improve the sustainability of the trade and it's contribution to poverty alleviation can be made based on existing information at local, national and international levels
- For some aspects, further research is required to determine best options (technical and socio-economic)

In short, action is urgently needed on two major fronts:

(i) The Resource Base: establishing ecologically sustainable resource use patterns

(ii) The Trading System: establishing an economically sustainable system where all involved receive equitable and reasonable benefits from the trade

3.7.2. Recommendations

The recommendations made by the Indonesia case study team comprise general recommendations applicable to the country as a whole, and specific recommendations for the case study areas.

3.7.2.1. General Recommendations

General recommendations consist of an overview and commentary, in Table 36, on the 16 potential mechanisms provided as part of the case study background, including applicability to the case study areas. These recommendations were felt to be quite comprehensive and to cover most main points other than one: resource/resource use sustainability. Other than a general point that this is a major consideration in any long-term poverty alleviation programme, because this is of necessity linked to the local environmental and social conditions, this aspect is dealt with under the specific case study recommendations section.

Table 36 - Sulawesi Team Perception of Background Paper
Potential Pro-Poor Mechanisms

Type of Potential Mechanism	Remarks Based on Case Study
1. New social certification or standards and 4. Incorporating social issues within existing (mostly environmental) certification schemes	• **Consistency, build on existing potential:** The feeling is that for one product it is better if there is only one scheme, so that consumers, producers, governments, potential aid agencies and other support organisations are not confused. Therefore the feeling is that the existing MAC standards should be promoted rather than looking for new standards. • **Pro-poor Flexibility through use of local legislation:** The social aspects can be combined easily into the MAC standards in Indonesia through the appropriate use of PERDA and PERDES, as one condition of certification is compliance with existing legislation at all levels. In this way, appropriate pro-poor mechanisms can be adapted for local conditions in each area (Regency and even village) and for some items, e.g. minimum prices, the levels/standards can be reviewed every year under existing systems. • **Consumer attitude:** The team does not have enough knowledge of the consumer base to comment with confidence on willingness to pay a premium for voluntary certification measures. However the level of concern expressed on the internet from hobbyists would indicate that at least some consumers would be willing to pay, especially if the price difference was not high, and even more hobbyists would pay a premium if the fish quality as well as the social responsibility factor was also superior. • **International Policy, possibly a two-edged sword:** If certification, or at least being in the process of certification, is made obligatory by importing countries, then any increase in consumer price will not be such an issue, though price increases could disadvantage wild-caught fish from poor countries as opposed to captive bred fish from more developed countries. Therefore if such measures are implemented without proper support for communities in producer countries, it could have very negative impacts on poverty, as powerful players pass on their costs to those least able to defend themselves, the poorest people in the chain, or in the worst case, the market for the poor fishers produce is lost altogether.

Type of Potential Mechanism	Remarks Based on Case Study
2. Ethical trade Initiative and Corporate Social Responsibility (consume demand-led or supplier-driven? Visible to consumers or not and 3. Fair Trade	• No existing Fair Trade organisations/brands have a standard for ornamental fish as far as the Team knows, though on contacting their representatives some are open to the idea of including ornamental fish in general or even specific species as Fair Trade commodities. • Corporate responsibility and ethical trading can be applied by any organisation, whether or not under or part of a dedicated "Fair Trade" brand or network. • Because there is no existing Fair Trade scheme, it would make sense to promote one certification scheme, as above, which could be adopted by Fair Trade brands and networks, and by ethically-inclined traders generally, as a guarantee of a product giving a fair return to poor producers and of environmental responsibility. To set a global standard for fair returns or minimum price does not make much sense. • Therefore once again the team feels that the use of the MAC system in combination with appropriate local legislation would be the answer, promoting this as a basis for inclusion of Indonesian ornamental fish in Fair Trade and Ethical trade systems world-wide.
5. Macro-level changes to trade policy and legislation, and their implementation, e.g. tariff reductions	• In theory this idea is seen as having good potential, but with one very important caveat: BEFORE implementation, there needs to be extensive action to build the capacity of poor and pro-poor stakeholders in the producing areas (from village to National level) to comply with conditions of reduced tarifs or other macro-level changes such as making certification obligatory. • If this is not done, it is likely that major players will reap all the gains and the poor become ever poorer as they cannot compete, being penalised additionally by higher tarifs. • CITES registers species such as ***Cheilinus undulatus*** (Napoleon wrasse) need especial attention.
6. Regional and National export promotion. National image/frame-works to support national/local branding and national codes of conduct and 8. Branding by poor producers (not necessarily based on social issues, perhaps on quality, and not necessarily formal branding, but perhaps just development of reputation of product from particular areas in which the poor operate)	• These two can be combined to good effect. A local example in Central Sulawesi is the promotion of Palu ***bawang goreng***, dried fried onions. ***Bawang goreng*** are produced nation-wide, however one variety of onions grown in the Palu valley have special qualities, which if they are grown elsewhere do not develop, and which other varieties grown in the valley also do not develop. This makes the end produce superior to that from other areas. Local entrepreneurs, starting from home industry (sole producer/trader) level, developed this product to the point where it became renowned locally. The Local Government then stepped in and assisted with promotion of the branding through packaging design, promotion etc, and now it is a product with nation-wide image and premium value. • It is possible that a similar effect could be achieved in the ornamental fish trade, where improved standards implemented at local or national level by OFT stakeholders could become recognised, and could be promoted in-country to buyers/exporters and by Regional and National Government or other organisations to an international market. • Once the quality is established, the promotion need not be excessively expensive, if creative use of existing mechanisms such as the internet, trade journals, and exhibitions/events were made.

Type of Potential Mechanism	Remarks Based on Case Study
7. Building social capital among small-scale producer groups i.e. social mobilisation and capacity development	• This is an absolutely essential aspect, and worthy of extensive support. Without capacity at the base level, poor people cannot take advantage of any of the other potentially pro-poor mechanisms, so that many mechanisms intended to be pro-poor will effectively become pro-rich and benefit those well off and powerful, while increasing poverty. • Building strong organisational basis at the local level and the federating these organisations (as proposed at the Banggai Stakeholder Meeting) could have far-reaching consequences and go a long way to tackling poverty through capacity to participate in or even initiate other proposed mechanisms.
9. Increases in product quality or other factors likely to bring about price increases - attempts to increase prices not related at all to the status of producers, but just general methods of improving prices	• Product quality can be increased through improvements in human resources (skills etc), and technical aspects (including equipment). Areas where there is great room for improvement include capture, holding and transport at the source and intermediary in-country levels at least, possibly also at higher levels in the chain of custody. This will need significant investment, which will have to be translated into increased returns. • Possibly the best way to achieve higher returns is though a recognised certification system such as MAC, especially if well-promoted to retailers and customers as a worth-while investment.
10. Possibilities for re-distribution of benefits throughout the chain and 11. Cutting out links in the chain	• Redistribution is highly unlikely to occur without intervention by organisations with regulatory powers, at local, national or international level. Those already well-off will not willingly see their margins reduced, and will fight any legislation which might do this. However if the regulatory authorities have the political will and the power at the appropriate levels to impose greater benefit sharing, it could be possible. • If there is any significant increase in benefits at higher levels, at least in-country the beneficiary's will if left to themselves just pocket this. If there is strong legislation or incentives to do so (e.g. to gain certification) they are likely to be willing to share this EXTRA benefit with stakeholders lower down the chain. • No stakeholder will willingly be "cut out" of the chain. Where this has happened naturally (through lack of profitability) in Bangkep, no significant advantage has accrued to poor stakeholders. However in some cases shortening the chain not just in terms of numbers of people but in terms of distance and time in transit could greatly improve end-product quality and be very beneficial. • Through building strong local organisational capacity, collecting areas could theoretically sell direct to national and even international levels. The internet (marketing and even selling over the net) is a potentially powerful tool for this if properly used. • There is a risk of increasing poverty among the less able people involved in the higher market chain levels, especially employees and casual workers at larger OFT facilities, and low-level intermediaries such as the Tumbak buyers.

Type of Potential Mechanism	Remarks Based on Case Study
12. Assistance provided (infrastructure and human capacity) to: - increase the ability to deal with SPS requirements and to participate in WTO and EU negotiations - provide a better understanding of how the EU functions, and to build up capacity for a rapid response to new developments in the EU decisions and policies, as well as being able to monitor such decisions and policies	• The knowledge of these procedures, organisations and negotiations, even what they are, as well as content and relevance is nil or almost nil at the Regency level, where under Regional Autonomy (OD) many crucial policy decisions are made. As the OD process advances, leadership and policy making at this level will become ever more crucial to the future of Indonesia. • Therefore the team feel that the EU must take note of the OD implications, and it is vital that serious efforts be made to reach out to the independent Regencies directly, NOT only through National level contacts in Jakarta or even relying on Provincial level, though Provinces, who play a co-ordinating role, need to be considered also, again through direct contact rather than relying on the central Government to disperse information, which unfortunately rarely happens in an effective and/or timely manner. As a simple example, opportunities and invitations for participation in major national and international events are often communicated to provincial level after the said events have ended, and are generally never communicated to Regency level. • At the levels where power is being devolved, mastery of the English language is still a very rare skill, and in order to reach these levels, communications in all formats (printed, electronic, audio-visual, direct oral communication etc) need to be in Indonesian language. This also limits ability to participate effectively in international gatherings or communication forums. • Long-term, building of capacity in foreign languages, especially English, is one key to empowering local areas (Provinces, Regencies and below). The teaching staff themselves in areas further from the centres in Java and Bali are often themselves incapable of effective communication in English. Capacity building in language education could pay big dividends in improving access of people from poorer and more remote areas to global information and participation in the world community, in political, economic and other spheres. • There is no internet access in many Regencies, through lack of infrastructure. Investment in this infrastructure would open the door to many possibilities, including the potential to participate more widely in international affairs as well as trade.
13. Access to credit	• Unless people are always going to rely on handouts from whatever source, some credit mechanism which is available on fair and realistic terms to poor people, including ornamental fish collectors and small traders, is essential to enable them to climb out of poverty. • In Banggai, access to credit on reasonable terms for poor people, including those involved in the OFT, is almost nil. They are generally at the mercy of loan sharks and other informal credit providers, or of help from other poor people, but only to cover emergency expenditures. There are no established mechanisms for credit for business improvement purposes for these people. Even for the better off, facilities are limited in remoter areas such as Bangkep.

Type of Potential Mechanism	Remarks Based on Case Study
13. Access to credit (continued)	• Existing potential (such as the BPD in Banggai) could be expanded through capacity building as in mechanism 5. • New mechanisms such as the STREAM self-help or the Grameen Bank model could be set up, and could have many beneficial effects on general livelihood levels as well as income as communities become stronger and more self-reliant. • Existing Government models which have so far failed could be improved, for example using the ideas of Pak Bailia (Appendix 11).
14. Access to technology, e.g. more processing of shrimp by poor producers themselves, better collection techniques for ornamentals to reduce mortality	• This is felt by the Sulawesi team to be another key area, where there is much scope for improvement, and the international community could play a major role, not just in terms of aid (cash or equipment) but in terms of knowledge sharing, assisting in making recent advances know more widely, from international level right down to the local levels. • Mechanisms through which such knowledge transfer could occur include NACA at regional (Asian Region) level, STREAM at National (Indonesian, Philippines etc) level and locally-based Tertiary Education Institutions such as the STPL in association with NGOs such as YPH (who between them can reach out to all lower levels) at sub-country level. • In some cases assistance in terms of funding would be necessary, and a knowledge distribution network as described above, once established, would have the local contacts and other local knowledge to identify effective channels for implementing such aid. • For Bangkep specifically, in-situ breeding of the Banggai Cardinalfish, ***Pterapogon kauderni*** is one instance where research advances made abroad could (should) be transferred to the local community, from academics to villagers. Note that for in-situ breeding of BCF: YPH is already in the process of seeking to do this in co-operation with U.K. based researcher Dr Niklas Kolm, and the partnership is seeking support (see specific recommendations).
15. Tax breaks for poor producers/groups or low intensive operations	• The team feels this would be hard to implement in Indonesia for the ornamental fish trade, because very few poor people involved in the trade pay any taxes anyway. • However for other commodities such as shrimp, it would make a great deal of sense, especially if related to mangrove protection, a vital and urgent issue, as proved by the effects of the recent Tsunami. Deforestation of mangroves for shrimp farming is not yet a major problem in Bangkep, possibly as the mangroves are of limited extent, but in Central Sulawesi generally it is a major concern.
16. Support for Alternative Livelihoods	• In Bangkep, few people rely 100% on the OFT. Relying on one commodity is always risky, and places people at risk of becoming poor if this one source of livelihood is reduced or stops either temporarily or permanently (e.g. though market forces, international tension etc).

Type of Potential Mechanism	Remarks Based on Case Study
16. Support for Alternative Livelihoods (continued)	• Alternative livelihoods or creating a diversity of livelihood options within the nuclear family or effective social unit (often an extended family) can not only reduce poverty levels but also act as a buffer to adversity and reduce vulnerability. Therefore greater diversity could reduce poverty not just in the short term but over the long term, under the ever-changing circumstances of the real world. • This approach needs to be very flexible, and take into account local conditions and even the individual family circumstances. The guidelines given by Pak Bailia (Appendix 11) make a lot of sense. Many projects have failed because they have applied the same "alternative" livelihood to a whole village or even at Regency, Provincial or national scales, without taking into account natural and human characteristics or market capacity. For example, a local NGO in Bangkep recently ran a programme to increase women's welfare through the provision and training in the use of sewing machines for 80 people. However, in any one village, how many people can make a living? Especially as ready-made clothes are often cheaper than material by the yard. • In Bangkep options include promoting aquaculture (e.g. BCF, seaweed, shellfish), eco-tourism (accommodation, food, production, souvenirs, services such as transport by sea and on land, guiding, etc), developing in-community services (artisanal, repairs, sales etc) and of course there are others. For all, marketing is a key: • Eco-tourism services cannot be developed to any economically meaningful level until there is at least some promotion to attract these tourists, and basic infrastructure (such as transport and accommodation) to get them to the area. Once in the area, there will be no benefit to locals unless their stay is organised in a way that will enable and indeed encourage them to interact with the local population. For example, not just dive on the reefs from a self-contained live-aboard without setting foot ashore, but in addition visit local villages, have opportunities to socialise with local people, learn about local culture and livelihoods, buy local produce (even say just fresh coconuts), use local services, etc. • Aquaculture is pointless if there are no buyers or the market is not ready to absorb the product in the quantities produced, or if the market price is below real production cost. • Community services will only work if the wider community is ready to use them (the sewing machine example). • Gender aspects are very important in this mechanism. For example, in most OFC families, the women do not participate in fishing, either through traditional gender-based divisions (Banggai ethnic group) or modern influences (Bajo ethnic group), and have limited roles in post-harvest operations also. Money-making opportunities are generally less for girls and women than for boys and men. However women's income is often more likely to be directly spent on welfare items (less tendency to smoking, drinking, though spending on personal vanity can be equivalent) and therefore contribute to effective family poverty alleviation. Women's social influence is also related to earning power.

3.7.2.2. Specific Recommendations from the Case Study

Recommendations in this section are based on the outcomes of the two Stakeholder Meetings (Appendix 13 and 14) as well as the data collected during the study, and have the support of major stakeholders at both Regency and Provincial level. Some recommended actions, especially related to use of the endemic species ***Pterapogon kauderni*** (Banggai Cardinalfish or BCF) will be initiated during 2005 with local resources, and national/international support is already being sought (through proposals submitted to various organisations) for further efforts.

The recommendations in this section address the two main areas of concern identified by the case study team for sustainable poverty alleviation through the OFT: the resource base and the market system. Some measures address both. In terms of marketing systems, it is important for the overall welfare/livelihoods outcome that the OFT makes a contribution not only to the households of people directly involved, but, through appropriate regulations and fees systems, to the wider community as well. This is because services such as health, education, infrastructure maintenance etc are expensive, and Banggai Kepulauan has very few resources other than marine and terrestrial natural resource on which to draw. As the National subsidies are gradually withdrawn under OD, these services will automatically be amongst the first to be reduced unless locally-sourced government income at Regency level can be raised.

In Appendix 6, where the results of the biophysical survey work undertaken by the team are given in some detail, a number of specific requirements for sustainable and profitable trade in the endemic species ***Pterapogon kauderni***, the Banggai Cardinalfish or BCF, have been identified. In addition, the team has identified measures with wider applicability to the OFT as a whole in the Bangkep area. These have been combined and are shown in brief below.

(i) General Areas Requiring Attention:

- Conservation of Fishery Stocks and Habitat (coral reef/reef flat/seagrass areas) through:
- Improved compliance with existing law (awareness, law enforcement etc)
- Local Legislation (PERDA/PERDES) on marine resource management, including specific fisheries regulation (fishing seasons, reease of brroding male BCF, capture methods and gear etc) and more general rules (against habitat destruction etc)
- Capacity building including improvements in OF capture methods (skills and equipment)
- For BCF: in-situ Breeding programme
- Establishment of LMMA (Locally Managed Marine Area) network, starting with at least one pilot LMMA/MPA
- Selection of a Pilot Village where the suggested conservation/sustainable use measures will be trialled and where necessary improved for wider application

- Improvements in the Market Chain/System through:
- Price regulation
- Improved concerted licensing and surveillance (DKP, Karantina, Koperindag, Police etc)
- Institutional capacity building (fishermen's groups, wider OFT structure)
- Improved market and information access (including for the longer-term, language skills and IT - Information technology)
- Initiating process towards MAC certification of the fishery, initially for BCF

- General Livelihood Improvements
- Alternative livelihoods/skills improvement especially for non OFC family members (e.g. women and girls)
- Attention to sanitation, fresh water supply and other health issues and to education including general life-skills (e.g. budgeting, planning) and specific skills (e.g. fisheries/post-harvest)

(ii) Specific Intervention Programme:

Program Pendataan Terpadu (Biofisik & Sosek) Ikan Hias dan Uji Coba (Pilot Project) Konservasi BCF di Banggai Kepulauan Tahun 2005/2006 - Integrated Ornamental Fishery Data Collection (Biophysical and Socio-economic) and Banggai Cardinalfish Conservation Pilot Project in Banggai Kepulauan Regency in 2005/2006.

- **This programme will be multistakeholder:**

- Academia/Tertiary Education Institutions: local (STPL) and international (through Dr Kolm, currently at U.E.A[6], U.K.)
- NGOs: local (YPH, YMB) and international (MAC, Reef Check)
- Government (inter-departmental, executive and legislative, law enforcement/judiciary etc)
- Local Community (OFC , Village Heads, village council BPD and other groups/individuals)
- Private Sector (OF traders, including APIHI, lawyers, possibly others)
- Other Stakeholders (Development bank BPD, KNPI, others)

- **Expected output from the data collection:**

- Improved data on the distribution and condition of ornamental fish populations, especially BCF
- Improved socio-eceonomic data on OFC in the Regency and on the ornamental fish market potential and systems operating at all levels, from reef to retail
- Database of baseline biophysical and socio-economic conditions which can be used to monitor the effects of interventions and external impacts
- List of potential sites for building an LMMA (local MPA) network
- Scoping and stakeholder consensus for initiating MAC certification process
- Increased capacity of stakeholders involved in the process (fisheries students/staff, DKP staff, villagers, etc)
- Draft for local ornamental fish/BCF related regulations (PERDA/PERDES) which can be ratified by the appropriate bodies after the proper stakeholder consultation process
- Selection of a Pilot Village (or pilot area - could be sub-village or two adjoining villages) for trialling further conservation/sustainable use and livelihood improvement measures. Selection to be based on objective data and on the commitment level of the village stakeholders
- Established contact with international organisations and individuals who can become partners in improving the OFT (such as MAC)

- **Activities and Output from the Village-based Pilot Project (2005/2006):**

- Participative research on the effects of fishing pressure, to determine sustainable fishing levels for BCF
- In-situ BCF breeding trials with local OFC communities, initially led by academic staff and students, and gradually handed over to the villagers
- Drafting, consultation and ratification of PERDES
- Building of partnerships (local, national, international) to improve the long-term profitability of the trade in BCF, for the villagers and for other local stakeholders including the local government.
- Design of a monitoring system for the BCF fishery
- Planning for activities in 2006/2007 in the pilot village and more widely in Bankgep Regency.

[6] University of East Anglia

4. Java/Bali Case Study

4.1. Site selection

4.1.1. Background

Marine ornamental fish trading has been growing in Indonesia since the 1960's, starting from Jakarta as trading and government center. In the 1980's-1990's, ornamental fish trading spread to several Provincial capital cities in Indonesia such as Denpasar (Bali), Surabaya (East Java), Makasar (South Sulawesi), Medan (North Sumatera) and Biak (West Papua). Market demand for marine ornamental fish trading dramatically increased, creating conditions for exporter to expand their companies to eastern Indonesia including Bali and Banyuwangi. Bali became one of the major centres for marine ornamental fish trading largely because Bali has much improved International flight facilities so that since 1990's (Table 37), exporters started to develop their companies in Bali. Overall, marine ornamental fish export from Bali dramatically increased from 1995 to 2005 based on the indicator that total exporters dramatically increased as well. Unfortunately, no data is available showing total export trade value. European countries such as England, Germany, Italy, Spain, Switzerland, Sweden and other countries sush as the USA, Canada and Japan are all export destinations for marine ornamental fish from Bali.

Table 37 - Increase in Ornamental Fish Export from Bali during 1990-1999 (ten years)

Export from Bali	**1990**	**1991**	**1992**	**1993**	**1994**
Volume (no of fish)	2,139,986	2,297,290	3,766,260	3,509,929	4,882,980
Value (US $)	1,030,275.75	1,295,163.14	1,588,898.60	1,880,587.99	1,899,161.96
Total Export Value (US $)	34,172,095.97	67,460,067.45	78,596,070.02	80,932,072.91	54,648,626.54
Increase	3%	2%	2%	2%	3%
Export from Bali	**1995**	**1996**	**1997**	**1998**	**1999**
Volume (no of fish)	6,855,276	9,781,090	8,203,265	5,104,072	3,943,469
Value (US $)	2,505,356.91	3,084,193.57	3,654,874.70	2,042,273.57	1,600,711.08
Total export Value (US $)	57,446,363.11	74,604,264.66	87,512,318.61	99,758,074.63	109,717,059.31
Increase	4%	4%	4%	2%	1%

Source: Dinas Perikan Propvinsi Bali. (IMA-Bahtera. 2000)

Bali-Banyuwangi makes a major contribution on Indonesia marine ornamental fish trading, with the majority of exporters in Indonesia based in Bali-Banyuwangi. In the early 1990's there were 6 exporters, but by 1994 this had increased to around 40 exporters (MAC 2004). Fish supplied came from Bali-Banyuwangi insider or outsider fishermen. Fishing grounds located outside Bali-Banyuwangi include Sulawesi, Nusa Tenggara, Madura, Irian, Maluku and Kalimantan. Bali-Banyuwangi fishermen use boats to reach the fishing grounds around the islands above. The majority of fishermen using cyanide fishing practices (DKP, Telapak, IMA 2001). Cyanide that is sprayed on coral reef, as marine ornamental fish habitat, has had serious impacts, as if uing 20 cc cyanide, a fisherman could damage coral reef over an area 5 meter square in a 3-6 month period.

Bali-Banyuwangi has more than 2000 ornamental fisherman, many of them located in Banyuwangi. There are about 1500 fishers with 143 middle-men, in the 4 villages of Bangsring village, Ketapang village, Mandar Village, and Gilimanuk. Based on this data regarding the marine ornamental fish business, this business is important in Banyuwangi, where fishermans from 4 village depend on their life on sea ornamental fish trading, particularly for Bangsring village. Special assesment of ornamental fish trading, especially for Bali-Banyuwangi, required a comprehensive study of this business.

Beside economic problems, environmental aspects are important issues in this business, because until now, Indonesian people think that marine ornamental fish trading is an illegal activity that includes destructive fishing practice, but in fact the business still goes on, the goverment show lack of care and close their eyes so they do not have accurate data. Expectation from the study is to complete picture of the tends related to marine ornamental fish trading in Indonesia. As a result of study through collaboration between NACA-STREAM, Telapak, Bahtera Nusantara, Pilang, MAC and WWF, information and recomendations cn be made related to marine ornamental fish trading from Indonesia to Europe and USA included changes in the business for increasing the economic wellbeing of the fishing community.

4.1.2. Objectives

The Bali-Banyuwangi study sets out the following:

Goal

Encourage consumer pressure similar to that of the environmental lobby related to the collection of marine ornamentals through European agencies that ensures reasonable livelihoods for poor people involved in or impacted by the trade.

Purpose

Promote the development of policy changes and other actions related to the trade in ornamental fish with Europe which support poor people's livelihoods.

Outputs

Map the trade in ornamentals in the Bali-Banyuwangi and identify study areas for livelihoods analysis.

Identify poor people involved or impacted by the trade and develop an understanding of their livelihoods.

Recommend changes to ways of working so that poor people could benefit more.

4.2. METHODS

4.2.1. Design

In accordance with the results of the NACA-STREAM workshop held in September 2004 in Bali, this activity was run using participatory study methods through intense discussion and interviews with multi-stakeholders, particularly with key sites. Activities were done by team-work that involved representatives of institutions directly and indirectly involved in this issue. The Bali-Banyuwangi team that was formed in Bali workshop consisted of 4 people. This team worked for 3 months to collect primary and secondary data, to assess the chain of trading and business impact on fisher community economic wellbeing using dissccusion methods with related institutions (particularly government and exporters) and develop formal and informal group dissccusions with fishermen from sites identified during the Bali workshop, representative villages around Bali-Banyuwangi.

4.2.2. Process

Selection of Team Members and Action Planning

During the Bali workshop in September 2004, four people were selected to work in the Bali-Banyuwangi team, as they were already involved in and working for marine ornamental fish issues in Bali-Banyuwangi. Bali-Banyuwangi team members are Arsonetri - team leader

(Bahtera Nusantara), responsible for overall working details, data collection techniques and report development, Imran Amin (Telapak), responsible for secondary data, data analysis and workshop facilitator, Ms Made Indrawati (Pilang), and Ketut (Fisheries Agency Bali Province), responsible for secondary data and Bali workshop. The team has been working since September 2004 to January 2005.

Secondary Data Collection

Secondary data collecting resources gain from local goverment agencies such as Fisheries Province and Regency agencies in Bali-Banyuwangi, reef fish exporter association, and NGOs. Duration this activity is September-November 2004 with graduation step around Bali province and Banyuwangi regency.

Team Planning Workshop

The team planning workshop in September 2004 was facilitated to draw up a detailed plan for actual conduct of the livelihoods analysis which involved selection of sites for the study, detailing of activities, scheduling, tasking, deciding on participatory tools (checklist of questions for the key informant interviews or KI and focus group discussions or FGD) and approaches to be adopted, and other logistical arrangements. The workshop provided also an opportunity for team members to refresh on the basic principles, approaches and techniques in engaging communities from the courtesy call phase up to the actual conduct of KIs and FGDs. The team conducted a pre-testing activity in **Desa Bangsring** and **Desa Ketapang**, Kabupaten Banyu wangi, using the tools and approaches that were prepared. A reflection session was facilitated after the field trial to assess the pre-testing activity with the aim of making some modifications on the tools and the plan, and also improving the manner the stakeholders are engaged into conversation. Areas reflected on include the process, content, profile of participants, pre-activity preparations such as secondary data collection and meeting with key persons in the community.

Participatory Methods and Tools

The basic methods used for the livelihoods analysis were secondary data collection, key informant interviews, focus group discussions, and attendance in meetings of community associations as well as actual observation of the processes involved under each chain of custody from fish collection to packing for export shipment. Participatory tools used include:

Seasonal calendar to establish peak and lean months of fish collection and availability of certain species of ornamental fish at certain months of the year

Venn diagram to assess and establish the institutions who can impact on the lives of fish collectors

Communication Issues tool to identify communications, language issues and power relations between and among stakeholders involved in the trade

Mobility map to establish in-migration and out-migration patterns and the reasons for such migration in the community

Wealth ranking to elicit criteria used by communities for categorizing social status and have an overview of the general well-being profile of the community

Historical timelines to understand history of ornamental fish trade in the area which may shed light to current situations and practices

4.3. SITE SELECTION AND DESCRIPTION

4.3.1. Site Selection

A short list of potential sites for the study was identified after the secondary selection phase in April. The team developed a set of criteria to rationalize the choice of sites for the livelihoods study. The underlying aim is to select sites where diverse stakeholders involved with the trade could be found who could help enhance understanding of the dynamics of the trade chain of custody in a holistic manner. These criteria are:

The site must have a significant number of ornamental fish collectors

Ornamental fish collection is one of the main sources of livelihoods in the area

Other stakeholders in the trade such as financiers or exporters or consignees are available in the area

There is a considerable ornamental fish trading activity in the area

A site where there are organized groups of collectors, a management plan and LGU support and a site where ornamental fish collection is the main source of livelihood but collectors are not organized.

Some baseline data are available from secondary sources or previous studies

Presence of support institutions or entities that could respond to the recommendations of the study

Accessibility of the site

Peace and order

4.3.2. Overview of the Sites Selected

4.3.2.1. Desa Bangsring, Kecamatan Wongsorejo, Kabupaten Banyuwangi

Demographics

Bangsring village is one of village (from total 9) that located at Wongsorejo sub-district, Banyuwangi district, East Java. The village is a coastal village where the majority of villagers are farmers and fishers with a total population of 5,350. Bangsring has total cover area for about 10,000 hectare with distance from the regency capital city of about 8.5 km and this village is strategically situated on the trans-Java highway, making possible for villagers to undertake trading with other Provinces in East Java. Bangsring fishers are marine ornamental fisherman; even the head of the village is a marine ornamental fish collector.

Health

Health facilities that are available in village are 1 puskesmas (clinic) and 8 posyandu (sub-clinics) which are used for imunisation and family planning (KB). Average level of villagers' health is good, although there are several villagers that have low health levels, particularly farmers and fishers with low incomes so that it is difficult to get food with sufficient nutritional quality.

Education

Education facilities that are available in the village are limited to primary (elementary) school; Junior and senior high schools are available at sub-district and district capital cities. The level of education villagers of the villagers is low, 82,4% did not finish elementary school (table 1).

From these data, the level education of Bangsring villagers is in the low category, but similar to many other coastal villages in Indonesia.

Table 38. Education level of Bangsring villagers, year 2004

Tingkat pendidikan Level education	Jumlah Orang Peoples	%
Belum sekolah	995	20.69467554
tidak sekolah (usia 7-45 tahun)	523	10.87770383
SD tidak tamat	1300	27.03826955
SD	1144	23.7936772
SMP	550	11.43926789
SMA	257	5.345257903
D1 - D3	21	0.436772047
S1	14	0.291181364
S2	4	0.083194676
Total	**4808**	100

Source: Kantor Desa Bangsring

Average education level of Bangsring marine ornamental fishers is elementary school so that they do not have enough knowledge about regulations/acts related coastal resources utilization and fishing gear. Conflict was created when certain people from government used regulations/acts as tools to pressure collectors and fisherman.

Resources

The coastal and marine resources found in Bangsring are seagrasses and corals with abundant marine ornamental fish along a coastline of more than 5 km. Currently, based on fishers' information, coral reef condition was damaged because of destructive fishing activities, bom and cyanide that started since 1970's. Bangsring fishers started sailing and fishing far away from home to other islands because of decreasing resources (Diskan-BYW).

Besides the coast of Banyuwangi, Bangsring fishers have fishing grounds outside Banyuwangi and Bali such as Wakatobi (Southwest Sulawesi), Takabonerate (South Sulawesi), Banggai (Central Sulawesi), Mollucas, and Biak (Papua).

History of the trade in Desa Bangsring

Bangsring marine ornamental fish trading started in the 1950's, indicated by the finding of several un-operated fish pools around the Watudodol area. In the 1970's, marine ornamental fish trading raise-up again due to demand from Jakarta. In 1976, a fish trader from Jakarta, representing the export company (PT. Banyu Biru), came to Bangsring to gave financial support and introduce cyanide fishing for fishers. The trade started with 2 families and increased it's influence until now more than 500 families finally depend on the marine ornamental fish business. In the beginning, fish had been sent to Jakarta through land transportation, but since 1980's to present, fish are sent from Bali by airplane. In 1995, an exporter from Bali (PT Bali Blue) gave financial support for fishers in Bangsring (H. Moh. Arif) with a large investment of more than 30 marine ornamental fishing boats. Currently H. Moh. Arif has become the top of collector in Bangsring. At this moment, Bangsring village is the biggest supplier for Bali exporters, but unfortunately they are still using destructive fishing practices.

Issues and Problems Some of the issues that raised during discussions with community groups include:

Ornamental Fish Collectors (Fishers)

Currently, Bangsring fishers have problems with limited fishing grounds, this is because of decreasing of fish stocks, meanwhile fish demand continues to increase, particularly for certain species. Other problem is zoning system at West Bali, a big part of which area is now a National Park.

Conflict with security (Police, Navy, and Park Rangers), often fishers get arrested when fishing, which creates an under pressure fishing situation for fishers. Illegal activities are often done behind the backs of the security officers by fishers to gain food for their family.

Difficult to solve the cyanide problem because fishers thinking that there is no more effective alternative fishing methode than using cyanide. Marine ornamental fishers have a bad image, even when they fish with environmentaly friendly fishing methods.

Fish price still depends on middlemen (financiers) where fishers do not have good bargaining position.

Financiers

In general financiers do not make a profit when fishers can not get many fish because the returns are not enought to recuperate the capital that they give to the fishers. In some cases, if fishers do not got permitted by security oficers to fish, they return from fishing without fish and financiers loose the capital that they gave to fishers in advance.

Money payments are very high when fishers are caught by security officers and financiers have to pay for the release of their fishers, it can even make financiers bankrupt. Sometimes illegal extortions from security officers are faced by financiers as well.

Increasing fuel prices is sometimes not matched with increased fish prices, as fish price is determination by the exporter. The level of fish mortality is still high, particularly for reject fish from exporter firms, this condition make financiers businesses sometimes unprofitable.

The financiers are aware about the cyanide problem, and complain about the risk of arrest by security officers because it means spending a lot of money. But it was not such an issue for fishers.

Issues and Problems Issues and problems that raising during discussions with different stakeholder groups include:

Dinas Perikanan Kabupaten Banyuwangi (DKP)
Banyuwangi Regency Fisheries Agency

Marine ornamental fishing not yet become priority for Banyuwangi fisheries agency, at the moment effort to create alternative fishing instead of cyanide fishing is still in process. Law enforcement and socialization are hard tasks for this agency, meanwhile criticism from environmental and conservation agency still goes to the fisheries agency.

Marine ornamental fish business has not yet made a significant contribution to Banyuwangi local income (PAD), as the catch resulting from fishing (mostly as an illegal activity) is directly sent to Bali, Surabaya, and Jakarta without permits from Bayuwangi local government so that there was no income for Banyuwangi.

Lack of knowledge, infrastructure and media related to coral reef ecosystems and reef fish, sectoral conflict on coastal management, all contribute to make fisheries agency unable so far to develop coral reef management around Banyuwangi coastal area.

There is no clear and better regulation related coral reef management, particularly marine ornamental fish business, compared with the MAC certification system.

4.4. STAKEHOLDERS PROFILE

4.4.1. Major Players in the Trade Chain

4.4.1.1. Marine Ornamental Fish Collectors

Marine ornamental fish collectors are fishers directly or personally and physically engaged in taking marine ornamental fish from the reefs. They maybe classified as:

Free dive collectors (**Nelayan Pinggiran**): "breath-hold" or *manu-manu* divers who collect marine ornamentals in shallow waters usually to a depth of 6-10 meters for limited periods of time without use of any breathing apparatus. They use wooden crafted goggles and fins made of plywood, improvised wetsuits (jogging pants and sweatshirts) and gloves. They use barrier net, scoop net, closed nets and potassium cyanide diluted in a bottle in catching ornamental fishes. For fish post-capture holding they were using part of tire with O2 gas inside and using the middle of tire for placing a receptacle.

Compressor or *hookah* divers (Nelayan Compresor): who collect marine ornamentals in deep waters to a maximum depth of 40 meters (30 depa) for longer periods of time. They use an engine-driven compressor unit (usually hydro-brake compressors from big trucks) with a metal barrel that serves as air reservoir (*hookah*). Air flows through a hose that is attached to the mouth of divers. The hose serves as a breathing apparatus to allow the diver to stay long underwater. Most of these collectors are permanent crew employed, trained and equipped by the financier or operator. They are also "piece rate" collectors.

Long-distance fishers (Nelayan Seberangan): these fishermen travel by medium-sized boats to others islands, for 15-25 day fishing trips, usually with 15-20 fishers in one boat. Fishing ground locations include Sulawesi, Nusatenggara, Maluku and Irian (Papua) islands.

In generally, currently most Bangsring fishers are fishing around other islands, because of decreasing fish stock around their home area so that they have to seek out other fishing grounds.

4.4.1.2. Financiers

Financiers are middlemen usually found in communities where ornamental fish collectors are not organized and have limited resources and capacities to finance their fishing trips as well as to link with exporters. They fund diving trips of fish collectors, purchase the catch from the collectors, screen, pack and ship the fish to local exporters in Bali, Surabaya and Jakarta directly or through consignees. They hire screeners, packers and recorders to assist in their operations.

The financier funds the cost for a collection trip of about 4-12 divers and all paraphernalia and equipments needed as well as the repair and maintenance. These include the pump boat, compressor, goggles, flippers, nets, food, fuel, oxygen, and packaging materials. The financiers also pay the penalty fee in case the boat is caught by law enforcement teams. It is also a practice that the financiers give advances to families of collectors before they go on a trip and these are deducted from the collector's earnings on their return. Financiers play an important role in providing credit to the immediate needs of the collectors in this situation where the latter have no access to formal credit institutions.

4.4.1.3. Exporters

Exporters are entities operating mostly outside the communities who buy marine ornamental fish from suppliers and sell them to importers and wholesalers abroad. They have direct link with importers, hence have more control of the pricing. They usually have their own aquarium facilities and fish purchased from suppliers are further screened and purged in their holding

facilities before packing and shipment to importers. They hire screeners, aquarium cleaners, packers, and administrative staff for their operations. They are the main source of information on pricing of fish by people involved in the trade within the country. They are the dominant players in the trade chain. (Example: PT. Golden Marindo, Cab Banywangi).

4.4.2. Other Inconspicuous Stakeholders

4.4.2.1. Packers and Odd job Workers

Photo.1 Packer team Check water level for shipmet

Packing workers are mostly men, there are about 5-8 persons, depend on the size of the order. Their main job is to check the buyers order is well-packed in the box. In the packing process, the team is lead by a person that has knowledge and skill related to product specification (fish species) and packing specification, because every buyer has their own specific requests. In Banyuwangi, packing workers sometimes have other tasks besides packing, especially when there is no packing job. Packing workers receive various salary rates depending on work skill and duration of the work. Leaders receive an average salary IDR.750.000 – IDR.1000.000 every month. Members of the team will receive average salaries of about IDR.500.000 – IDR.750.000 every month. Meanwhile, they will gain over-time money as well because sometimes packing work is conducted over night, often until morning.

Photo.2 Fishes in Boxes ready for shipment

PT. Golden Marindo which have branch in Banyuwangi (Ketapang), is lead by a branch manager Mr. Joko, who is the person with authority to lead all company export activity. Mr. Joko is assisted by administration and financing staf who have task of dealing with export document and paying for fish. According to Joko, his company refuses fish from cyanide fishing, although it is difficult to buy cyanide-free fish around Bangsring and Ketapang.

4.4.2.2. Screeners

Screeners at the exporter's level are regular skilled and experienced men or women staff who evaluate the fish for quality and acceptability and only those fish that pass their screening gets paid. Based on an interview at Golden Marindo, they get a relatively higher pay of about IDR 750.000-1.000.000 per month (US$90). They getting room, meals and bonus as well if have been work more than one year. These staffs sometimes handle fish finding that are ordered by buyers through administration staff.

4.2.2.3. Aquarium Cleaners

Aquarium cleaners at the exporter's level are regular men and women staff whose main function is to clean the aquariums and holding facility as well as replenishment of clean marinewater in the aquariums. They usually get a monthly pay of about IDR.

Photo 3. Aquarium Cleaner

300.000,- to IDR. 500.000,- per month (US$70) with free board and lodging, and other mandatory compensation benefits. Beside takecare with cleaning of aquarium, they have responsibility on fish nursering and feeding 2 times everyday.

4.5. MARINE ORNAMENTALS CHAIN OF CUSTODY IN BANYUWANGI

In general, the overview of the chain of marine ornamental fish trading will describe the overall picture of marine ornamental business in Banyuwangi, a long of chain with many institutions involved and a source of high operational costs. An interesting point about the chain of ornamental fish trading is lack of transparancy about the market and access, so that fishers (collectors) get the lowest income with highest work risk, similar to the chains of other fishery products. Marine Aquarium fish are collected based on exporter order from Jakarta and Bali. But currently, exporters have established their company in Banyuwangi as well. Due to exporter growth in Banyuwangi, many financiers went bankrupt because the chain of trading was shortened as fishers started selling their fish directly to exporters.

Limited quantities of certain fish products was forcing fishers to go to faraway fishing grounds and financiers (middleman) have to invest more capital if they want keep the trust from their exporters. As way out of the problem, exporters often give down payments to quarantee that financiers sell their fish to them. In this case, financiers are in a poor bargaining position to determinate fish price compared to the exporter. As a result of this problem, financiers put more pressure on fishers. The result of investigation and interview is that fishers are the components that gain the lowest incomes in the trading chain so that they are/become poor people. The stigma that marine ornamental fish tradining is an illegal activity, pushes all business players to use illegal approaches (KKN - corruption, colusion & nepotism). To protect their trading, businessmen have to give money to government officers so that operational costs for Bali-Banyuwangi traders become higher.

Beside doing "***pinggiran***" or nearby coastal fishing, Bangsring fishers doing "***sebrangan***" or mong-distance fishing to Sulawesi and Kalimantan as well. Fishers sell to Mr. Sutrisno (financier) and directly to exportes in Bali as well. Price of "***sebrangan***" fish is higher than "***pinggiran***" fish. Fish such as Maria fish in Ketapang/Banyuwangi with super class will have price between Rp.80.000 – Rp.90.000 and piyama fish between Rp.75000 (Sudi). Usually, fishers work for financiers. Commonly, financiers provide the boat, fishing gear and buy the fish. Each boat takes around 6-7 fishers. Financiers sell their fish through two routes. The first is local trading which means they sell fish to other financiers in Bogor, Surabaya and Jakarta. The second route is selling fish to Bali. There are 28 financiers in Bangsring. Commonly, a financier has 4-7 boats.

Figure 81 is a map of collection areas, and Figure 82 is flow chart of stakeholder's identification on chain of Banyuwangi marine ornamental fish trading.

Figure 81 - Map of OFC Fishing Grounds near Banyuwangi

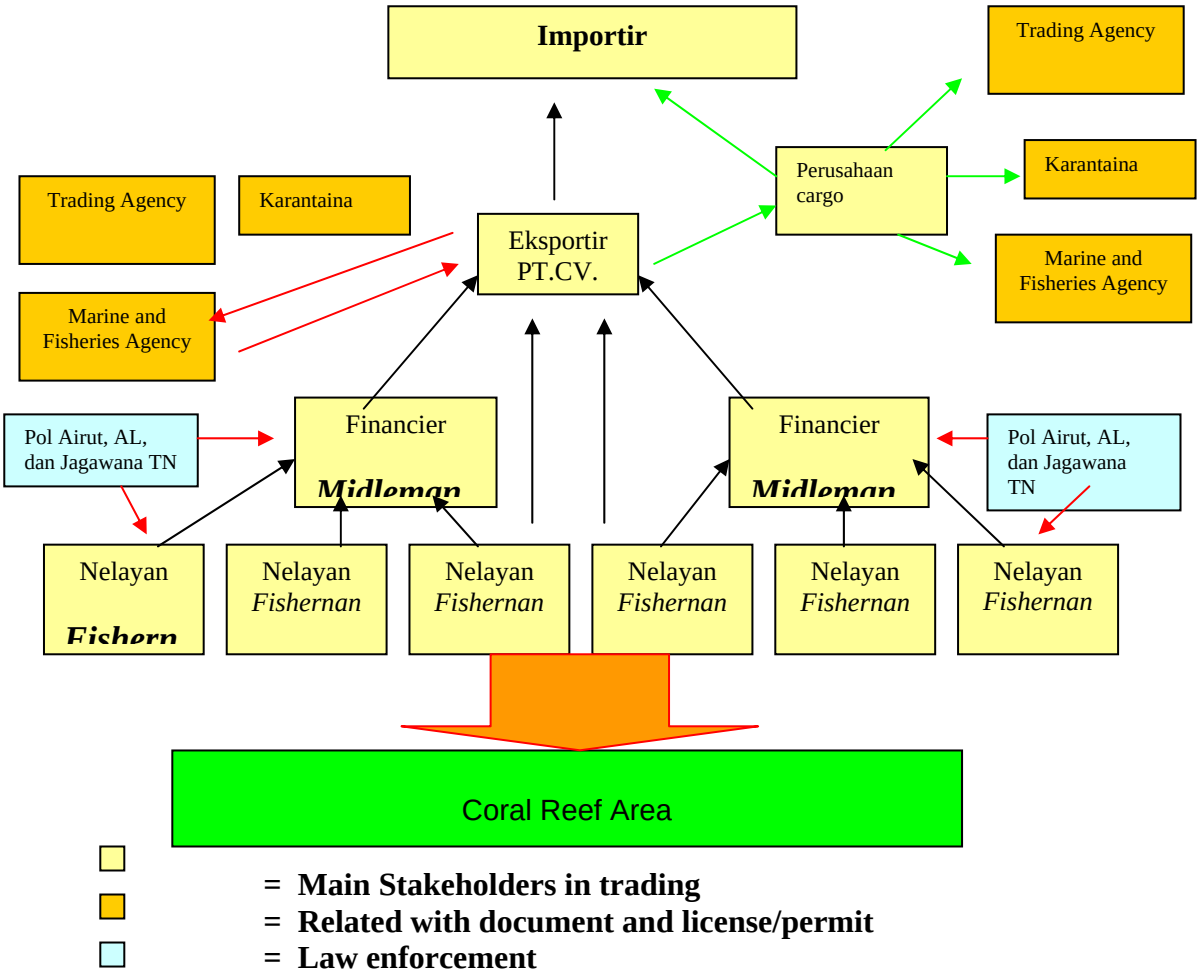


Figure 82. Chart of Stakehoders on Chain of Banyuwangi Sea Ornamental Fish Trading

4.6. LIVELIHOODS ANALYSES

4.6.1. Economic and Financial

Most Bangsring fishers are involved in ornamental fish collection, which is now their main livelihood activity. In certain seasons, when there is no order from financiers or exporter, they do food fish fishing or takecare of their gardens/farms. Income from ornamental fish collection is high, and this activity is seen as a good prospective for Bangsring fishers. Therefore, when first the ornamental fishing business was introduced to Bangsring fishers, many changed from food fish fishing or farming to ornamental fishing as a primary income.

Besides collecting, the aquarium fish business has opened job apportunities as packers or fish carers, as generally financiers need 3-6 persons per operation. Commonly, financiers recruit their family including their wives. Fish carers have the task of looking after the fish before they are sent to exporters in Bali, Jakarta dan Surabaya.

In a disscсusion with the fisherman's group organised by Mr. Sutrisna, some of the fishers and financiers are still confident that the aquarium fish business has good propects in the future. Orders from exporter are stable or increasing but fish stocks are decreasing, in some cases seemingly wiped out. The other problem is weather. In the bad weather season they farm, work as labourers or catch food fish using a type of floating fish aggregation device called ***rumpon***.

4.6.1.1. Seasonality of Ornamental Fish Collection:

Income from the aquarium fishing business depends on the weather and other conditions at the fishing grounds. The best season is between March to July. August is usually a transition season from West to East season, with changes of current, wind and wave which make seagoing difficult. In September, the weather gets better untill mid-December. From Mid-December to February, once again the weather is bad, in the West season, so that during this time Bangsring fishers go East to Bali (Karang Asem) to fish. Fishing seasona are also influenced by religious ceremonies, and during the fasting month of ramadhan (October -November in 2004) for one month fishers did not go to sea.

Table 40 - Seasonal calendar of ornamental fish collection in Desa Bangsring, Banyuwangi

Period	Months											
	J	F	M	A	M	J	J	A	S	O	N	D
Peak months												
Lean months												
Weather conditions	Big waves Compressor fishers can still operate		Good weather, except for big waves at full moon and the dark of the moon				Big waves poor visibility	Good weather, except for big waves at full moon and the dark of the moon				Change-able, big waves
Other reasons	Repairs often done											Fasting forbidden to go to sea
Dominant species caught:	Angel fish, politan and damselfish		All fish, depending on orders					All fish, depending on orders				

Note: Free dive Fishers & Compressor Fishers and Long-distance (Sebrangan)

4.6.1.2. Trends in Buying and Selling of Ornamental Fish

According financiers in Bangsring village at the FGD, they do not have a good bargaining position with the exporters. The exporter has the authority to determine price, and there is little room for negotiation. The increase in price from the exporters has not been in line with profits obtained by (according to the financiers) from the impact of rupiah (IDR)/dollar (US$) rate changes where they say there has been an increase since 1998 of 500%[1] in the rupiah obtained per dollar. For example the Jahe-jahe fish has only increased from Rp.500 to be Rp.600. The trend of price changes at the financiers level in Bali-Banyuwangi mostly similar.

In general, buying price at the financier level is around 1/3 of the selling price. This is divided as follows: 1/3 for the fish (to the collector), 1/3 for equipment qnd overheqds, qnd 1/3 for the financier as his profit. For example, if the buying price is IDR 1,000, the selling price will be IDR 3,000.

Several financiers complained about recent increases in operational costs. The main increasing component is fuel cost, because more fule is required for aquarium fish are higher rather than for food fish because fuel is needed both for the boat engine and for the compressor (Hookah). Operational costs so far have tended to run parallel with increasing fish price from the exporter, which has been as a way out of the problem, but when fuel costs rise and there is no fish price increase, the financiers can make a loss. The fish prices started to rise since the economic crisis in Indonesia in 1998 – 1999, with dollar rate changing from Rp.2000 to Rp.15000/dollar, as the top levels of aquarium fish businessman got big profits because fish were paid for in dollars.

Table 41 - Comparison of buying and selling prices in the last ten years in Banyuwangi

Species		1990-2000 Harga ikan sebelum krisis		2000-2004 Harga ikan setelah krisis	
Cammnod name	**Local Name**	**Buying price (RP)**	**Selling price (RP)**	**Buying price (RP)**	**Selling price (RP)**
Clown fish	Klon fis	4.00	1.000	6.00	1.600
Long nose butterfly fish	Kepe moyong	2.000	6.000	3.000	9.000
Dik damsel	Putri bali	3.00	9.00	6.00	1.200
Blue damsel	Podangan	3.00	7.00	5.00	1.250
Coral beauty angelfish	Ag. Model	1.000	2.000	3.000	9.000
Coral beauty angelfish	Ag, Polos	-	-	7.00	2.000
Damsel angelfish	Ag. ngu	-	-	7.00	2.000
Blue grend puler	Jahe-jahe	2.00	500	350	600
Hambug damsel	Zebra hitam	2.00	7.00	4.00	9.00
Indian hambug	Dakocan	2.00	7.00	4.00	9.00
Cleaneris fish	Dokter asli	2.00	6.00	4.00	9.00
Emperor angel fih	Batman	7.000	20.000	15.000	55.000
Scorpion fish	Lepu ayam	2.500	7.000	4.000	11.000
Gaimard wrase	Keling merah	4.00	1.000	1.000	2.500

Source: Pak Sutris Financier in Bangsring Village

4.6.1.3. Marine Ornamentals Trading Activity

Aquarium fish trading in Bangsring village is a daily activity with regular consignement schedules to Denpasar, Jakarta, and Surabaya. Mondays to Thursdays is the busiest time for sending fish to Jakarta. On Friday and Saturday, financiers are usually busy receiving fish from

[1] In 1997, at local exchange rates, one US$ was around IDR 2,400, in 1998 it rose to around IDR 18,000 and has since stabilised around IDR 7,500 to IDR 9,500 since 2000. Taking amean value of IDR 8,500, this is an increase of over 3 times, not 500% but still very high.

«sebrangan» or far-off fishing grounds, inlcuding from Madura, Sulawesi, and Nusa Tenggara. Everyday, financiers are receiving local caught fish from fishers based on specific orders.

Financiers using pick-up cars for transport to Denpasar and Surabaya, which they usually own. For travel to Jakarta, financiers usually use the regular public bus service that passes through Banyuwangi town, sending the fish as luggage. Fish are often sent overnight so that exporter receives fishes in the morning. Benefits from sending fish in the night include avoiding traffic jams and fish mortality because of high temperatures due to sun light. Because many fish often die on these journeys, the financiers sometimes loose fmoney because they bear the risks of mortality in transit.

4.6.1.4. Shipment Income and Expenditure

Shipment Cost.

For financiers based in Bangsring, the cost of transporting the fish to Denpasar is covered by the Denpasar exporter for ordered fish. Trasport cost are about 10% of the total fish price. Transport costs to Denpasar and Surabaya consist of car/van rental, driver's fee, ferry ticket, and fuel. The costs for the packaging (plastic bags, rubber bands and oxygen) are quite low, because the bags are re-used and the oxygen tanks are just re-filled. Transportation costs range between IDR.300.000 – IDR.500.000. Financiers usually accompany fish to the exporter in Denpasar, where transport costs are re-imbursed, depending on the number of fish that sold. In one case, fish not suitable with exporter order so that decreasing price of fish. When financiers take fihs which have nor been ordered (speculation), they have to cover the transport costs themselves, and also the buying price is often reduced as the exporter knows they will be desperate to sell.

Fish are sent to Jakarta using plastic bags packed in styrofoam boxes. Plastic bags, rubber bands and oxygen are regular monthly supplies. The cost of these components can't be given in detail, because they vary and because financiers are reluctant to disclose sources and prices.

Income

Fishers income varies, and net income is related to equipment and methods used for fishing. Compressor fishers generally have higher incomes than free dive fishers. Usually, free dive fishers average income per week is IDR150,000 – IDR.400.000, so total income per month is about IDR.600.000 – IDR.1200.000. Compressor fisher's weekly income is around IDR.200.000 – IDR.500.000 or IDR 800,000 to IDR 2,000,000 per month. This data is based on financiers paying schedule which is every week, or no later than 3 days after financiers receive fish from the fishers.

A summary of estimated income per livelihood activity is shown in Table 3.

Table 42 - Summary of estimated income per livelihood activity at Bangsring Village

Livelihood Main Stake holder	Estimated Income Bangsring Village
Financier	Rp. 2.000.000,- 5.000.000,- per month (US$350)
Ornamental fish collectors - Free dive divers (around 20 days fishing) - Compressor Divers (around 15 -20 days fishing)	 Rp. 600.000,- - Rp. 1.200.000,- Rp. 800.000,- - Rp.. 2.000.000,-
Odd job wage worker	Rp. 300.000,- + Uang makan
Packers (twice a week)	Rp. 200.000,- - Rp. 400.000 monthly
Food fishers using nets and ***tongkol***	Rp. 300.000,- - Rp. 600.000,-

Note: Estimates based from information shared during FGDs

Average income of financiers at Bangsring village depend on with their turnover. Turnover depends on the fishing season and size of orders from exporters. Pak Sutris sends fishes to Denpasar around 2-4 times per week. Usually he fills the pick-up car to it's maximum capacity.

A full pick-up car will carry around 1000-5000 fishes with a turn-over of 1-3 million rupiah per trip, with profits of Rp.500.000 – Rp.1000.000 per week.

4.6.1.5. Credit

In the focus group discussion with Bangsring financiers, they said that they usually give some advances to the fishers before they go fishing. In addition to covering the costs of fshing trips, this money is often used for the daily expenses of fishers family as well. The money will be repaid through reducing the payment when the fishers bring their catch. Credit is also given specifically for major items of equi^ment such as boats, compressors, diving gear, oxygen and plastic bags. This type of loan is not repaid by one-off reductions in payment but by a hire-purchase type mechanisme, whereby the fishers pay onlya a little every time, but are tied and cannot sell to other buyers/financiers.
By this mechanism, the fishers are tied to the financiers, which is sometimes felt as a problem by the fishers. Fishers are almost never out of debt, and forever "***gali lubang-tutup lobang***" (dig holes to fill holes).

4.6.2. Natural and Physical

4.6.2.1. Collection Sites and Access to Resources

Campaign activity by coral reef conservation practitioners is limiting access to fishing grounds for Bangsring fishers. Collecting activity is now prohibited in many coral reef areas. For example, collaborative patrols between Bali Barat National Park Authority with WWF are run regularly around Bali Barat coral reef.

In general, Bangsring fishers aware that they do destructive fishing, but they cannot stop using the cyanide fishing method. Currently, they are attempting to fish secretly, playing cat and mouse with the authorities. Bangsring fishers going to fishing grounds to the east (Sulawesi, Madura, Nusa Tenggara, Maluku and Irian) tend to develop collaboration with local leaders. This collaboration includes paying some money to local leaders or heads of villages for permission to fish around their area. Haji Moh. Arif tends to pay about Rp.500.000 for each fishing visit, and in return their saftey is guaranteed while fishing in the agreed area.

Bangsring fishers having a number of fixed fishing grounds, but these locations are kept very secret. If a fishing team findsa good location for a specific fish, they will keep it to themselves, as a competitive advantage over other crews. The main fishing grounds in Bali Straits are shown in Figure 1.

4.6.2.2. Permits and Licenses

Banyuwangi local government does not have specific regulation on fishing grounds for aquarium fishing, aquarium fishers are considered together with consumption fishers. In local regulations which refer to national regulation, destructive fishing is covered but there was no management area and access for environmental friendly methods of fishing. Limits on access include the Bali Barat national park regulation where the determination process was done by the state, for conservation purposes (without community participation). The zoning system within the Management area means that aquarium fishers are not allowed to fish in that area.

In Wonsorejo Kecamatan, there are no specific permits for aquarium fishing, because the fishers are considered in the same category as food fish fishers, even when using different fishing methods. Business permits are available for financiers, from the local fisheries agency, by paying some money. There was no data that showing how much money was paid by financiers to the local fisheries agency. The other permit type issued is for aquarium fishing boat with capacity under 10 gross tons that is issued by the Kabupaten government.

4.6.2.3. Destrutive Fishing and Coral Reef Destruction

During discussions with several fishermen's groups at Bangsring and Ketapang, the problems that they raised include the need to fish for longer to get the same number of fish or even for fewer fish, and the need to go to far off fishing ground, increasing operational cost. These statements show that the natural resource base (the coral reef ecosystem) is in decline.

Destructive fishing activities such as coral mining, harvesting corals and other coral reef organisms, cyanide and bom fishing for food fish. The main type of destructive fishing is cyanide fishing. Imagine if 100 fishers work everyday, each using at least 3 lumps of cyanide (weighing roughly 20g) per dive, then a total average of 20 kg of cyanide will be sprayed on the coral reef everyday.

Fishers get their cyanide supply from financiers, who mainly get it in bulk from Surabaya. Cyanide is sold for about IDR.50.000 – IDR.60.000 per kilogram. The ease of obtaining cyanide is one reason fishers still use cyanide for ornamental fish collection.

This problem is one of concern to the Banyuwangi local government. Several awareness and training activities have been conducted, but there has been no significant change as a result so far. Most fishers still stay with cyanide fishing as a livelihood. According to the local fisheries agency staff, the eastern part of Banyuwangi beach has been so polluted by high concentrates of cyanide that the coral reef has been badly damaged. Bangsring fishers have been using cyanide in these areas since 1980. This condition is a valid reason for Bangsring fishers catching more fish through sailing far away from home to Madura, Sulawesi and Nusa Tenggara for fishing.

4.6.3. Human Capital

4.6.3.1. Household Labor

Members engaged in livelihood activities: Fishing activity in Bangsring is dominated by men, whereas women are not often involed in fishing activity, except in bringing the catch from the boats to the house or assisting their husbands in preparations before sailing. Poverty in Bangsring village pushes fishers to involve their children in fishing activity. Sometimes children leaving school to assist their parents; and become in their turn ornamental fish collectors.

Diving operations: in Bangsring and Banyuwangi, fishing activity is usually mainly undertaken in the morning and fishermen come back to their homes in the afternoon. If the catch is not enough they will go out again in the afternoon until dusk. They start at 6 am and oftren fish until 5 pm, for 5-6 days per week, except on Fridays when they generally attend Friday noon Prayer at the Mosque. Usually fishers meet to recieve their money from financiers, and then often go shopping for the next weeks needs, or pay off their debts.

4.6.3.2. Health

Marine ornamental fishing has a higher risk than food fish fishing, especially for pelagic species. In Bangsring, at least one fisherman has died every year because of it. But the fishers face the risk alone. There is no insurance for them. This condition occurs because the fishers do not know about the real risks of diving. If there is accident they believe it is because of supernatural forces.

There is a lack of health facilities and health staff (numbers and qualifications) in the area with knowledge related to the risks of diving, as practised by ornamental fishers. This causes fishers in Banring and Ketapang to resort to traditional medicine for solving health problem. Decompression sickness is frequent among Bangsring fishers, often causing pain, burst lung or partial paralysis. But even after being affected they often still continue marine ornamental fishing. The Head of Bangsring village, Mr. Samsul, said that level of fishers mortality because of fishing was at a worrying level.

4.6.3.3. Education

Educational attainment: Based on the focus group discussion, 90% of fisherman havea low level of education. Some of them could read but can not write properly. The average education attainment in Bangsring is Pimary school, though some of them did not finish that level. This is sometimes but not always due to financial problems. Often, children leave through lack of awareness of the importance of school. Fishing activity can be started at an early age, making Bangsring fishers often prefer to have another earner in the family rather than supporting the child to finish school.

4.6.3.4. Sources of information. In Bangsring and Ketapang, fishers got most of their information from the media, Radio, Newspaper and Television,epecially the local daily paper. Information related fish and coral reefs came from Distict (Kecamatan) level local government staff, but the staff themselves have insufficient information adn knowledge. This lack is a reason why Bangsring fishers are not getting ahead as fishers in other places are doing.

4.6.3.5. Knowledge and awareness of fisheries laws. Because their education level is mainly only Primary School, Bangsring fishers did not have knowledge on the laws or regulations related to marine aquarium fishing, particularly destructive fishing. It is one of source of conflict between the government decision makers and the fishers. Lack of knowledge on the part of the fishers is sometimes used by the forces of law and order or other government staff to ask money from fishers and also the financiers by using (undue) pressure.

4.6.4. Social Capital

Migration Pattern: The Bangsring villager's ancestors originally came from Madura (an small island just North of Java), while Indonesia was still a Dutch colony. The Madurese are fwell-known as seafarers and fishers. They have been fshing with compressors for a long time. When they first arrived in Bangsring they were full-time fishermen, but since they settled, many have started farming also. They speak their own (Madurese) language, not Javanese.

The marine aquariun trade and the major habour of Gilimanuk harbour, a major access-point for transit between Java and Bali, encourage more recent in-migration and visitors to this village.

Some of the financiers in Bangsring have come from other places, attracted by the business opportunities they perceived in Bangsring village. When financiers established their businesses, they also brought with them their families, who often work for them as fishers and farm workers. Other farmers have also moved to the area. The recent incomers are mostly from Madura, Central Java and East Java.

4.7 DISCUSSIONS AND RECOMMENDATIONS

4.7.1. Economic and Financial

Community organizing is a first step for capacity building marine aquarium fisherman. Communities could make fast progress through organizing. Moving forward together will give them more power and bargaining position so that they could get a better life. Marine aquarium fishers should get more opportunity for obtaining more income for their life, similar to income levels for other staheholders, because fishers face the highest risk and get the lowest income from the chain of marine aquarium fish trading. Average income of fishers is not more than 35% of total of financiers income, that is why the fishers stay as poor people.

Actually, Bangsring fishers have sufficient income but bad weather(seasonality) and limited collecting areas put them in difficult situation, they often loose several months income in a bad season. In off-seasons they borrow money from financiers. A new and better mechanism of financial management for fishers is required, such as co-operatives or fishers business units.

Banyuwangi local government and NGOs should be facilitators and assist fishermen, with specific programmes for ornamental fishers. If better managed, the marine aquarium business has the potential to increase fisherfolk welfare. The market needs to be more open at the financiers and exporters level, so that the market is not totally controlled by exporters. Opening the market would give opportunity for every level in chain of trading.

4.7.2. Natural and Physical

Regulations: Regulation on management of fishing grounds is required as a tool to preventing over fishing. Decreasing resources at Bangsring village are an indicator of over fishing. Another indicator is sailing to further and further destinations. This is a difficult task, and would take time, but could started by stock assessment research and determination of fishing ground boundaries in a participatory way. This process is important to develop management plan. There is a good example from Bali, where there was initiative to promote environmental friendly marine aquarium fish trading to conserve the coral reef ecosystem.

Increase awareness and understanding of resource users on the environment: Lack of knowledge of Bangsring fishers related marine resources conservation has made Bangsring fishers think that marine resources unlimited so that they could continue fishing with destructive fishing practices. Government and NGOs could be facilitators for increasing Bangsring fishers awareness related to coastal resources conservation. This is especially important as the desrtuction commited by Banyuwangi fishermen is spread all across Eastern Indonesia. Because of this, such activites also ned to be undertaken more widely in other areas outside Banyuwangi.

4.7.3. Human Capital

Technical training for fishers on ornamental fish collection, storage and packing: Capacity building is needed to improve the quality of fish and reduce mortality. From disscusion with exporters, a major issue was complaints about high mortality of fish, and generally poor fish condition on arrival. From other levels, complaints that the exporters use this as an excuse to pressure fishers and keep the price of fish low. Post collection training is needed at financiers level and alternative fishing methods for fishers is needed to replace cyanide fishing.

Provide collectors better access to health benefits/services: Fishers face high risks because of fishing, as is shown by fishers mortality level of 35 fishers dead in 10 years. This problem is due to lack of knowledge of safe diving and limited health facilities. To solve this problem the fishers need dive safety training and health insurance for fisherman.

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Appendix 1 - Planning Workshop Details

Agenda - Planning Meeting, EC PREP Livelihoods Study, Indonesia

23-27 August 2004, Sari Segara Resort, Denpasar

Date/Time	Item	
23 August	Arrival of Participants	
24 August		
0900	Introduction of participants	Aniza Suspita
0915	Overview and background	Dr MJ Phillips
	Guide to Livelihoods Studies	Dr MJ Phillips
1000	Coffee break	
1015	The Philippine experience: Case studies for EC PREP	Bebet Gonzales
1045	The Cambodian experience in livelihoods studies	Sem Viryak
11:15	The Indonesian-NGO experience in livelihoods studies	Gayatri Lilley
11:30	Informal presentations by other Indonesian participants on experiences with the marine ornamental fish trade and livelihoods	
1200	Lunch	
1330	Case study objectives, process and time frame	Dr MJ Phillips
1400	**Roundtable discussion 1:** Overview and background Process to be followed Locations and stakeholders Tentative livelihoods teams	
1545	Coffee break	
1600	**Roundtable discussion (contd)**	
1700	End	
1830	Group Dinner	
25 August		
0900	Synthesis of 24 August session	Bebet Gonzales
0910	Plan of action: Guiding points	Dr MJ Phillips
0930	**Roundtable discussion 2:** Composition of livelihoods team Plan of action – *process, relevant data requirements; collection and collation of secondary data; on-site community studies, study site, development of detailed plans, formulation of guiding questions, methodology/tools, and assignment of tasks; pre-testing.*	
1030	Coffee break	
1045	**Roundtable discussion 2 (contd)**	
1200	Lunch	
1400	**Roundtable discussion 2 (contd)**	
1545	Coffee break	
1600	Procedural tasks and administrative matters: Guiding points	M.J. Phillips
1630	Planning the visit to a sample respondent (?)	
1700	End	
1830	Dinner	
26 August		
0900	Synthesis of August 25 Roundtable discussions	Sem Viryak
0915	Final assignments and timeframe	Bebet Gonzales, Reby and Sih Yang Sim
1030	Coffee break	
1045	Final assignments and timeframe	
12:00	Lunch	
1400	Visit to a sample respondent?	
1830	Dinner	
27 August	Departure	

List of Planning Meeting Participants in Bali, 24-27 Agustus 2004

Name	Institution	Contact address
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Appendix 3
Banggai Cardinal Fish Population Data

A3.1 Distribution

The team undertook two types of population survey for the Banggai Cardinal Fish (BCF) or ***Pterapogon kauderni*** (Koumans 1933) populations, depending on the physical conditions at the survey sites. These were analysed and compared with available literature in order to assess the current condition of BCF stocks in the survey areas.

This information is important in order to evaluate the sustainability and environmental impact of the ornamental fishery, as the BCF is the main fish captured and traded from the Banggai Islands. In the case of the BCF it is especially important to ensure that stocks are not over-fished to the point of possible or actual extinction, because this species is endemic to a relatively small area (Figure A3.1), even though escapee fish have proven themselves capable of forming colonies in other areas with similar ecological conditions (Erdmann & Vangelli 2001).

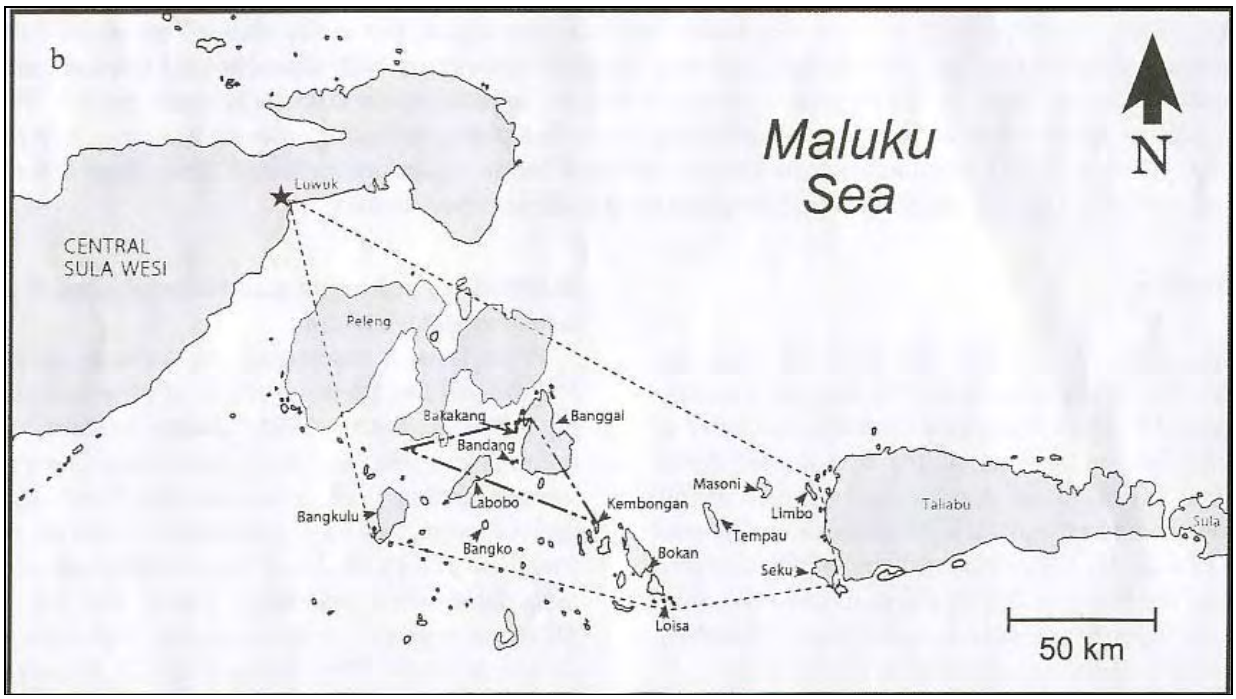


Figure A3.1 - Known Distribution of Pterapogon kauderni[1]

A3.2 Vulnerability

There are several factors related to the biology and ecology of this species, and to the market system, which make the BCF particularly vulnerable to exploitation.

Reproductive Strategy:

The BCF is a mouth-brooding apogonid with direct development (Vagelli 1999), and has the lowest recorded fertility of any apogonid (Vagelli & Erdmann 2002). In layman's terms, this means that after mating, the male fish keeps the fertilised eggs in a mouth pouch until they hatch, and the juveniles do not leave this refuge until they are capable of behaving as true fish, i.e. directing themselves and feeding independently. Therefore the BCF larvae do not have a pelagic or planctonic phase in which dispersal might occur. Factors resulting from this reproductive strategy that make the species vulnerable to local or total extinction include:

[1] From Vagelli & Erdmann 2002

- Low numbers of juveniles and high parental investment in each offspring mean that natural population growth is slow, and that the maximum sustainable yield is a relatively low proportion of the total stock.
- If wiped out in one area, even quite nearby colonies may not be able to supply juveniles to re-populate this area by natural means. This phenomena was witnessed by the team at the village of Liang, see Appendix 8.
- Collection of brooding males will have a major effect on future population levels

Habitat and Habits:

The BCF is found in groups of up to several hundred fish, in mainly shallow waters of 0.5 - 5m depth (Vagelli 2002, pers. observation)) which are easily accessible to even quite poor breath-holding divers, or even on foot. These areas are covered in seagrass, coral reefs or more often a mixture of both. These habitats are under pressure from many sources and are of limited extent.

The BCF stay in or near to three main micro- habitats: Diadema sea urchin colonies, sea anemones and branching corals. When threatened the BCF do not run away but rather simply "hang there", or retreat into these "refuges", so that collection is easy even for unskilled novices, especially in the diadema habitat (field experience). Therefore:

- The BCF habitat is accessible cheaply and easily from the fishing villages
- Fish can easily be collected in large numbers at once, from only a few colonies
- The species natural defense mechanisms provide no protection from ornamental fish collectors
- BCF collection does not require a high investment in collection equipment
- The habitat is vulnerable, improper fishing methods (or damage from other sources) could affect population levels and growth

Market Factors:

There is a ready market for BCF internationally because of the attractiveness of the species. This market is easily accessed by the local fishers in the Banggai through well-established and new trade links, which have. However the cost per individual at all levels within the country is low, mortality is quite high, the fish are easily damaged and therefore unsaleable, and demand fluctuates. These factors mean that:

- fishers need to catch large numbers to make the effort worthwhile
- traders also need to transport and sell large numbers to make reasonable profits
- more fish than required are caught to cover mortality and rejections at all levels
- fish are generally caught to satisfy maximum anticipated demand, so when actual demand is low, many fish may die before entering the market chain

A3.3 Survey Methods and Locations

Two quantitative survey methods were undertaken, measured transect surveys and swim surveys, with a total of 7 survey sites. Each method was applied at several different locations within the known BCF area, 5 of which are or have been fishing grounds and two of which are not fished. The locations are shown in Figure 8.2. In addition, other observations of a qualitative nature were made, and both film and photographic records were taken. The team made an effort to identify and survey locations which corresponded to each of the three categories of fishing pressure (3 =high, 2 = medium and 1 =low/none) as defined by Kolm (Kolm & Berglund 2003). Category 1 sites had never been fished, or only lightly and several years previously; Category 2 sites were fished lightly and/or infrequently, e.g. because of distance or being off the main fishing route; Category 3 sites were those which are fished on a frequent basis (at least once a month, some weekly or even daily).

The survey locations in Banggai District are shown above, those in Bokan Kepulauan District in Bottom Left and the Liang District Sites are in Bottom Right. The base maps are from Navigation Map 311 (Dinas Hidro-Oseanografi 1985).

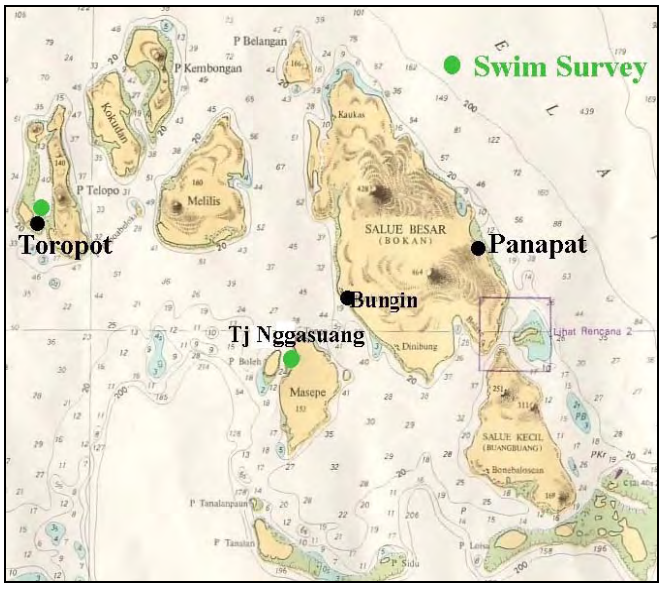


Figure A3.2 Pterapogon kauderni (BCF) Survey Locations

Transect surveys:
Originally it was planned to place 5 random 50m X 4m (200m²) transects within a 100m X 100m quadrat, as described by Dr Kolm (Kolm pers.com). However this was only possible at one site, Monsongan Bay, at other sites the site geography and other activities in the area (e.g. seaweed farming) made this unrealistic. Therefore a different number of transect lines was surveyed at each of the three locations, using the same protocol for each transect. Data was combined to give an average figure per 200m² transect for each location. Each transect was determined by laying a 50m polypropylene rope, weighted at 5m intervals, and marked with alternately coloured ribbons at 50cm and 1m intervals, with a third colour used to mark each 5m interval. The transect was taken as being 2m each side of the line. For each transect, time was allowed for fish to settle (though the BCF did not seem to take any notice, even when a transect line was placed right through the colony). Fish were counted first, then urchins, then finally substrate data was collected. On some occasions the same observer collected all data, on others different observers collected each data type, but making sure to observe the order of observation above. See Figure A3.3 below.

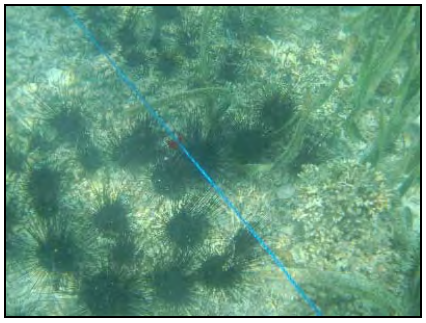
Data recorded for each location (3 sites) included:

- number of fish (sub-divided per 10m X 4m section, for most transects fish were recorded separately for each colony within the section)
- Juvenile and adult fish were recorded separately, using 3.5 cm SL as the dividing point, as this is the lowest recorded length for sexual maturity (Kolm & Berglund 2003).
- number of diadema urchins (sub-divided per 10m X 4m section, for most transects urchins were recorded separately for each colony)
- substrate composition using the point sampling method at 1m intervals, giving 50 points per transect, and using the GCRMN/AIMS Lifeform classification which defines 30 substrate categories (English et al 1997).
- Photographs and/or film on and around the transect

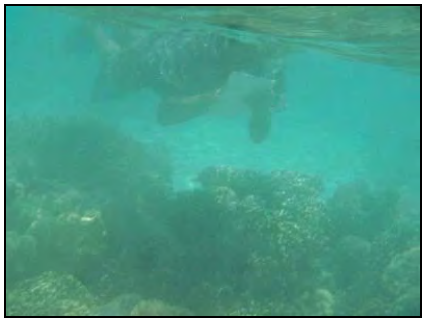
Making Transect Line

Training in transect method

Laying Quadrat at Monsongan



Transect at the Pearl Farm



Collecting Transect Data

Rewinding Transect Line

Figure A3.3 - BCF Transect Data Collection

BCF Swim Survey

The observers swam across the area, recording colonies of BCF and Diadema, also noting BCF colonies in other habitats. At each location data was collected during about 40 - 50 minutes, a similar time to that required to complete data collection on two transects. Two observers were involved in each survey, one counting and one recording. At Toropot and Tj Nggasuang (Panapat), two observer teams were deployed, so that the data collection covered an area roughly equivalent to 4 transects, while at Tinakin and the Liang locations only one observer team collected data. For each colony fish were counted before urchins. See Figure A3.4 below.

Data recorded for each location (6 sites) included:

- number of fish, recorded for each colony
- Juvenile and adult fish were recorded separately, using 3.5 cm SL as the dividing point, as this is the lowest recorded length for sexual maturity (Kolm & Berglund 2003).
- number of diadema urchins recorded separately for each colony
- A separate observer took photographs and/or film along the swim trajectory

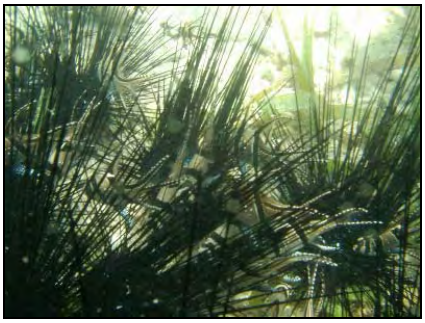
Swim Survey Tinakin- Observer

Swim Survey Tinakin - Recorder

Swim Survey Toropot

Swim Survey Panapat Team 1

Swim Survey Panapat Team 2



Panapat Pterapogon kauderni

Figure A3.4 - Swim Survey Data Collection

Other Data

Other data collected is detailed below. See Figure A3.5 below.

- Substrate data over a wider area was collected at two locations using the GCRMN/AIMS Manta Tow method (English et al 1997), which uses 5 condition and 6 composition categories.
- Observations were made of BCF colonies outside the transect/swim survey areas, including some photographic records.
- Water quality data was collected at all but one site (Liang), including temperature (thermometer), salinity (refractometer)and vertical visibility (secchi disc).
- GPS co-ordinates were taken for all but one site (Toropot)
- Fishing pressure at each location (from the socio-economic survey) was noted
- General weather conditions (cloud cover, wind and waves, air temperature) were noted

Monsongan Manta Tow Boat

Manta Tow Bone Baru

Measuring Visibility with Secchi Disc

Measuring Salinity

Measuring Water Temperature

Taking GPS Position Data

Figure A3.5 - Collecting Additional Data

A3.4 Survey Results

Pterapogon kauderni population data:

The transect data is summarised in Table A3.1 and the Swim survey data in Table A3.2.

Table A3.1 BCF Transect Data

	Monsongan Fishing Ground	Bone Baru Fishing Ground	Pearl farm Unfished Area	Average	Monsongan/ Pearl farm Ratio	Bone Baru/ Pearl Farm Ratio
Juvenile BCF	76	51.5	339	155	22%	15%
Adult BCF	27	41.5	242	103	11%	17%
Total BCF	103	93	560	259	18%	17%
Juvenile/ Adult Ratio	6.46	1.38	1.5	1.89	430%	92%
Diadema Urchins	745	459	279	495	267%	165%
BCF/Urchin Ratio	0.14	0.28	1.98	0.48	7%	14%
Adult BCF/ Urchin Ratio	0.04	0.09	0.87	0.20	4%	10%
Fishing Pressure	3	3	1			
Remarks	Regular Harvesting	Regular Harvesting	Never Harvested?			

Table A3.2 BCF Swim Survey Data

	Liang Harbour	Liang Island	Bone Baru	Toropot	Tinakin Village*	Panapat # Tj Nggasuang	Average
Juvenile BCF	320	11	213	778	233	1434	498
Adult BCF	55	2	75	421	49	398	167
Total BCF	375	13	288	1199	282	1832	665
Juvenile/ Adult Ratio	5.82	5.50	2.96	1.85	4.81	4.81	4.29
Diadema Urchins	147	257	910	1086	245	276	487
BCF/Urchin Ratio	2.55	0.05	0.31	1.10	1.15	6.28	1.91
Adult BCF/ Urchin Ratio	0.4	< O.01%	0.08	0.4	0.2	1.4	0.3
Adult Ratio to unfished[2]	43%	< 1%	9%	44%	23%	166%	39%
Fishing Pressure	1	2	3	3	2	2	
Remarks	Unharvested but Disturbed	Harvested Heavily once > 1 yr ago	Regular Harvesting	Regularly Harvesting	Previously harvested regularly but stopped	Harvested at long intervals	

* In the straits between Tinakin Laut and the small island opposite, for which only photographic and video data was collected, only about 10% of diadema colonies have BCF living in them, although the diadema colonies near and under the houses which were surveyed had quite good populations.

In the Tj Nggasuang lagoon where the team were taken from Panapat, many BCF are living in branching corals and anemones. The density of colonies was high (small distance between colonies)

The data reveal some interesting trends. The Tj Nggasuang (Panapat) population seems to be maintaining a very healthy condition, not only with high numbers of juveniles/adult but also high numbers of adults/urchin. All disturbed areas with a time-lag since collection show a high juvenile/adult ratio, which would indicate that like coral reef diversity, "intermediate disturbance" actually promotes reproduction. It could also be that this is a particularly favourable area, and that the population is merely remaining at a naturally high level.

It is worth noting that collection in Bokan Kepulauan has not been going for as long as in Banggai, and that the frequency of buyer visits is and has been (Lunn & Moreau 2001) lower.

All the other fished areas show clear signs of stress. The worst case was Liang Island, where one major over-fishing event seems to have almost wiped out the population.

Substrate Data

Quantitative Substrate Data is only available for 3 locations, Monsongan, Bone Baru and the Pearl Farm. Visual records are available for all sites. The substrate data is discussed in more

[2] Adult BCF/Urchin Ratio for the location divided by Adult BCF/Urchin Ratio for the Pearl Farm

detail for each location in the main text. The quantitative data was analysed to yield coral condition and substrate composition data which is summarised in Table A3.3 and Figure A3.6 below. A selection of representative images is given in Figure 8.7.

Table A3.3 - Coral Condition and Composition at BCF Sites

	Hard Coral	Soft Coral	Other	Dead Coral	Rubble	Sand/ Silt	Coverage	Condition
Monsongan Manta Tow	29%	4%	8%	9%	15%	35%	5 Tows 0.64km	40% Good 60% Poor
Monsongan Transects	45%	< 1 % (0.4%)	6%	16%	14%	18%	5 Transects	40% Good 60% Average
Bone Baru Manta Tow	11%	29%	4%	10%	21%	25%	8 Tows 1.9km	50% Poor 50% Very Poor
Bone Baru Transects	20%	14%	4%	20%	22%	20%	2 Transects	100% Poor
Pearl Farm Transects	28%	1%	17%	9%	13%	32%	3 Transects	67% Average 33% Poor

Note that the transects and Manta Tow although they overlap do not cover the same area, with the Manta Tow extending far beyond the transect survey areas, so it is not surprising that there are differences. The manta tow at Bone Baru covered the main fishing area as far as the BBI (Hatchery) site, close to the village boundary. The Monsongan Manta Tow covered most of the central Monsongan Bay coral reef area, some of which is dominated by sea grass. Seagrass was also a significant component (± 5%) alongside macro-algae (± 11%), at the Pearl Farm, accounting for the relatively high percentage cover of "Other" lifeforms. Note that there were no Very Good category areas, which is normal for the shallow reef flat areas where the surveys occurred.

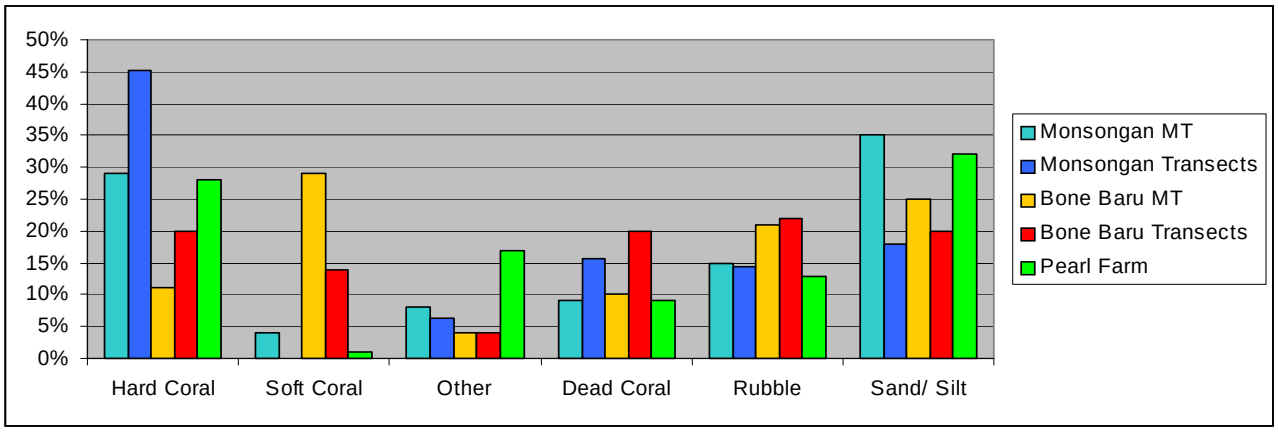
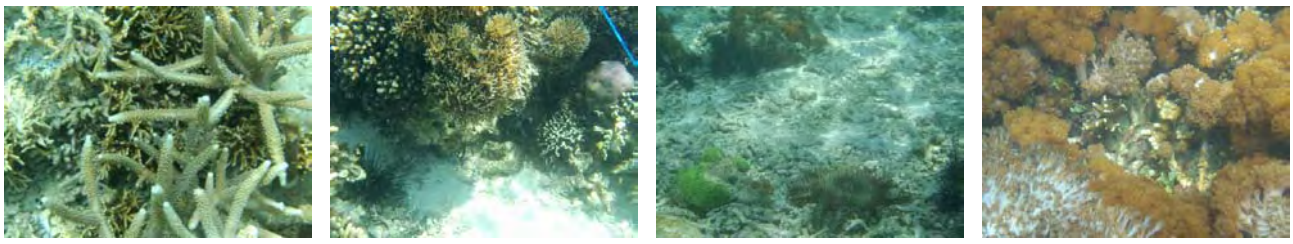


Figure A3.6 Graphic Summary of Substrate Data



Typical coral assemblage at the Pearl Farm

Typical coral assemblage in Monsongan Bay

COTs attack and soft coral at Bone Baru near BBI

Soft coral overgrowing rubble, Bone Baru Village

Figure A3.7 Substrate Sample Images

Position Data

All GPS data was recorded with Garmin Etrex GPS units, using WSG 84 and Garmin Worldmap software. The data is given in Table A3.4 below. Note: MT = Manta Tow.

Table A3.4 GPS Position Data

Location	Type	Latitude S			Longitude E		
		°	'	"	°	'	"
Bone Baru1	Village	1	31	51	123	29	44
Bone Baru2	Village	1	31	49	123	29	47
Bone Baru MT Start	MT	1	31	52	123	29	5
BB1	MT	1	31	58	123	29	1
BB2	MT	1	32	3	123	28	59
BB3	MT	1	32	9	123	28	57
BB4	MT	1	32	15	123	28	56
BB5	MT	1	32	21	123	28	54
BB6	MT	1	32	27	123	28	52
BB7	MT	1	32	37	123	28	49
BB8	MT	1	32	47	123	28	43
BCF Transect1	Survey Site	1	31	54	123	29	9
BCF Transect2	Survey Site	1	31	42	123	29	44
Hamlet of Bone Baru	Village	1	32	51	123	28	53
BBI Hatchery	Hatchery	1	32	39	123	28	56
Monsongan	Village	1	38	17	123	28	59
BCF Capture Site	Demo Site	1	37	48	123	28	47
Monsongan MT Start	MT	1	37	54	123	28	53
M1	MT	1	37	52	123	28	53
M2	MT	1	37	53	123	28	49
M3	MT	1	37	52	123	28	47
M4	MT	1	37	49	123	28	45
M5	MT	1	37	46	123	28	47
Quadrat1	Survey site	1	37	48	123	28	43
Quadrat2	Survey Site	1	37	45	123	28	45
Quadrat 3	Survey Site	1	37	48	123	28	47
Quadrat 4	Survey Site	1	37	50	123	28	45
Pearl Farm & Fish Pens	Survey Site	1	40	50	123	29	1
Pearl Farm Beach End	Survey Site	1	40	55	123	29	5
Pearl Farm Beach Start	Survey Site	1	40	52	123	29	5
Tinakin Laut	Village	1	36	11	123	29	26
Panapat	Village	1	59	26	123	51	42
Tanjung Nggasuang	Survey Site	2	3	9	123	45	32
Liang	Village	1	32	50	123	14	15
Liang Island	Survey Site	1	33	22	123	14	39
Liang Jetty	Capture & survey Site	1	33	3	123	14	30

Water Quality and Weather Data

The data collected for water quality and weather is shown in A3.4 Below. No visibility was recorded for Toropot because the water was not deep enough to permit the use of the secchi disc, however horizontal visibility was estimated at around 8-10 meters. This was the site with the lowest visibility, however the low cloud cover and shallow depth provided good conditions for survey and enabled some reasonable pictures/videos to be taken. The equipment for measuring temperature and salinity was not taken to Liang. At all stations where data was collected, the water quality was sufficiently good that this is unlikely to be a negative factor in either habitat condition or BCF population levels.

Table A3.4 - Environmental Conditions at BCF Survey Sites

	Air T°	Water T°	Salinity	Visibility	Cloud Cover	Wind/Waves
	°C	°C	ppt	metre	Octa	Beaufort
Monsongan	30	28	34	18	4	1-3
Pearl Farm	31	28	35	15	2	1
Bone Baru I (Headland)	31	28	34	15	2	2
Bone Baru II (Village/Bay)	31	29	33	11	4	1
Panapat	31	29	34	11	2	1
Toropot	30	29	34	Shallow	2	1
Liang Island	No data			> 15	2	1
Liang Harbour				3 - 5	2	1

Other Observations

In addition to collecting the qualitative data summarised above, the team spent time observing the BCF and making a visual record of the general conditions and the behaviour of these fish with photographs and video clips, using an underwater digital camera with both still shot and short video capacity. Some of the videos are contained in Appendix 7, and some extra photographs are shown in Appendix 2. Representative images are given below in Figure A3.8.

There was a noticeable age/size "gap" in populations of heavily fished areas, with very few medium sized (3 - 4 cm SL) fish, which is the size preferred by buyers. This does not show in the statistical data, but did make distinguishing juvenile and adult fish easy, as the transitional "adolescent" stage (around 3.5cm SL) was almost absent.

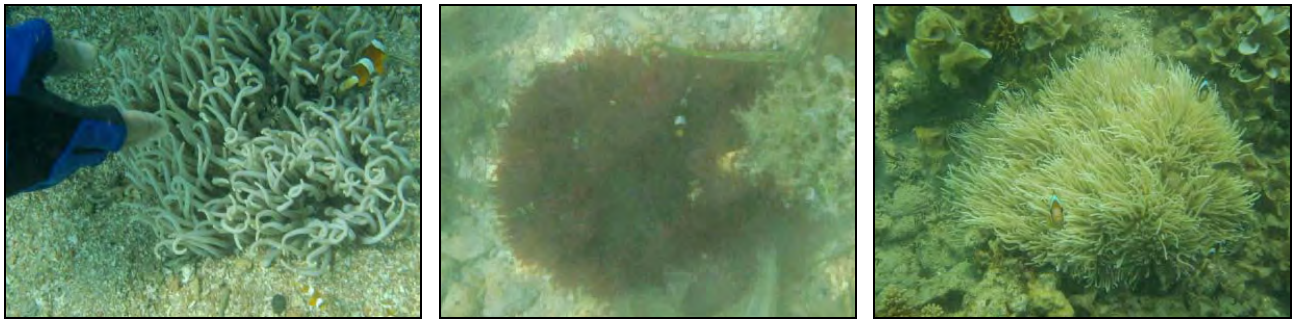
Suitable micro-habitat seems to include the tentacles of some benthic holothurians (3 seen) as well as the three better-known habitats, and the fish seem to wander further from their base in areas with relatively dense seagrass, "wafting" among the seagrass leaves for long periods.

Although the data is not conclusive, due to the "anecdotal" nature of the data, with no formal methodology, the observations made tend to support a number of theories put forward by other researchers. In particular:

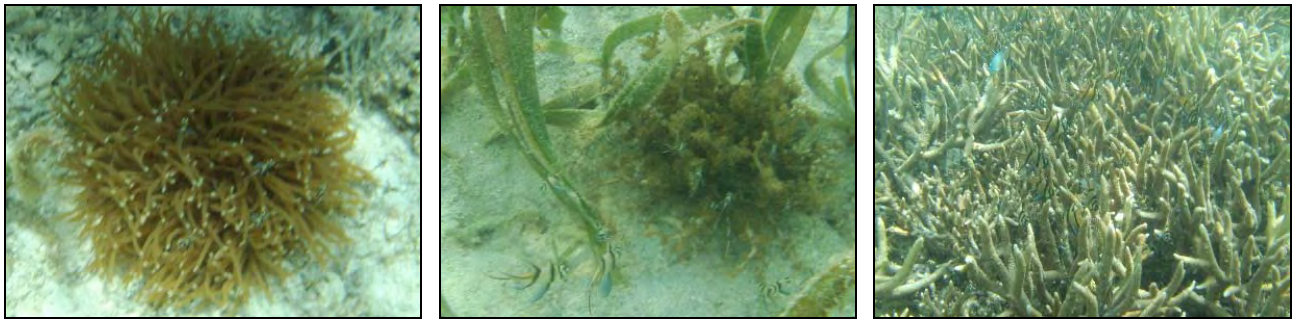
- Ontogenetic shifts observed by Vagelli (Vagelli 2004a) seem to be supported by the field observations of this team, indicating that anemones are a favoured habitat for small juveniles, while larger fish prefer diadema or branching corals
- ***Pterapogon kauderni*** is not unduly sensitive to certain types of environmental degradation, such as the presence of trash or (low-level) pollution, and high numbers can be found in impacted areas (Vagelli & Erdmann 2002)

- The fish seem to remain in static groups with little movement beyond the immediate micro-habitat, even when disturbed or even chased, and if they do move swiftly return to their original positions (Kolm & Berglund 2003). No exchange between groups was noticed, and no fish were seen in "open spaces" more than around 50cm from suitable micro-habitat
- Very few solitary fish were seen, except in cases where density was very low (e.g. Liang Island), however group size was noticeably smaller in the heavily fished areas, as reported in Kolm & Berglund 2003.

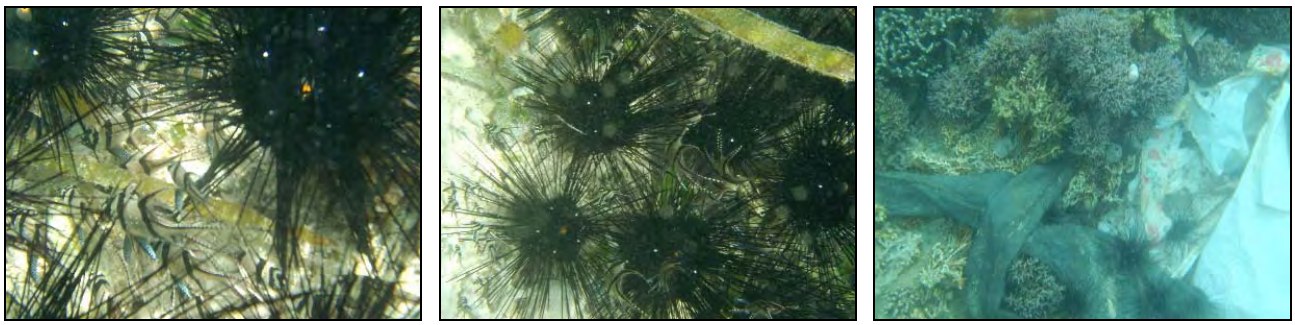
BCF at Bone Baru Point - no mid-size fish, nearby an empty urchin colony, below a keramba, released fish thrive



BCF juveniles in sea anemones, at Bone Baru village, Liang Island and the Pearl Farm



BCF juveniles in Heliopora Coral *BCF in a Holothurian's tentacles* *BCF in Acropora Coral*



Dense BCF colony at Panapat, all size classes present *BCF are living with this trash...*

Figure A3.8 - Images of Pterapogon kauderni in the Banggai Islands

A3.5 Conclusions and Recommendations

The fishing of ***Pterapogon kauderni***, the Banggai Cardinal fish (BCF) which begun in the 1990s, would seem to have had a substantial impact on the populations of this endemic species with a restricted distribution. The fears expressed by previous researchers[3], academic institutions[4] and concerned members of the public, seem well-grounded in fact. The impacts include a reduction in the overall population, specific age-class over-fishing, and in some cases habitat degradation which may impact not only this but other coral reef fisheries.

In at least one case (Liang Island), over-fishing seems to be capable of effectively wiping out a local population, possibly beyond the level at which natural recovery can occur. Even if the few remaining fish do breed, it is possible that genetic variation may be insufficient, and inbreeding depression may further inhibit recovery. Genetic variation between stocks is thought to be high (Hoffman et al 2004) and therefore introducing fish from one location to another, even quite close by, could have impacts on the genetic structure of the population, and also possibly cause out-breeding depression. However the alarmist predictions made by some, of an imminent extinction of the species, do not seem to be borne out by the reality in the field, and it is felt that this species can be both saved from extinction and sustainably harvested for the benefit of local communities, if appropriate measures are taken in a timely fashion. Impacted populations seem to show a higher rate of reproduction than the un-fished population, indicating that recovery is likely to be possible in all but extreme cases.

Based on these considerations, the survey team feel that the following measures would contribute to the conservation and sustainable use of ***Pterapogon kauderni***:

- Legal: Local regulations at the Regency (PERDA) and Village level (PERDES) regarding the collection, handling and trade in ***Pterapogon kauderni*** (and possibly other ornamental species) should be developed. Fishermen should be involved in the drafting process. Existing laws and regulations relating to destructive practices should be socialised and implemented.
- Technical: The whole market chain should be investigated in detail from a technical view-point to reduce mortality and damage, and where applicable improvements should be implemented by local government and at national and International (buyer country) level, if necessary through legislation. Practical training should be given where necessary.
- Organisation & Communication: Communication and co-operation between fishers and between all "stakeholders" involved should be facilitated and where appropriate institutionalised.
- Fair Trade: Social welfare and principles of equitable benefit should be considered throughout, in order to ensure all participants receive a fair return from the trade. In some cases this may necessitate legislation at local, national and international levels.
- No-take Areas: Specific "refuges" should be established for ***Pterapogon kauderni*** populations, in areas where protection is realistic and habitat suitable.
- In-situ Breeding: "ranching" or other in-situ breeding programmes, for re-stocking and to provide fish to the aquarium trade, should be considered, and trials undertaken at a suitable location. Assistance should be sought from concerned researchers at the international level who have a wealth of experience with this species and have expressed a desire to help
- Trial: A "model village" (or possibly more than one) should be selected, where ideas for the sustainable and socially beneficial use of BCF stocks and other activities relating to ornamental fish trading and the welfare of fishing communities generally, can be applied, evaluated and if necessary modified before large-scale implementation is undertaken

[3] Kolm & Berglund 2003, Lunn & Moreau 2004, Vagelli & Erdmann 2002

[4] The Natural History Museum, http://www.nhm.ac.uk; UNEP-WCMC, http://quin.unep-wcmc.org

Appendix 5 - Statistical Data for Banggai and Bokan Kepulauan Districts

Most of the following data is not available on a per village basis, so that the overall figures for the wider administrative area(s) are given. In some cases the facilities listed are expected to cover the whole of the District or even (in the case of Banggai) the Regency.

A5.1 Fisheries Vessels and Equipment

This information is available only on a District or Regency level basis. The Regency level data is given in the Maps section, Appendix II, although it is less up-to-date than the District data.

Item	Banggai (BPS 2004a)	Bokan Kepulauan (BPS 2004b)
Motorised Ship (registered tonnage)	5	2
Small boat with inboard motor	72	32
Small boat with outboard motor (usually *katinting*)	68	536
Unmotorised craft (*Sampan)*	722	654
Net (large)	112	103
Hook & Line (sinking)	457	8018
Bagang (drop net vessel)	18	2
Fish Trap	375	859
Gill Net	293	179
Throw Net	5	25
Lift Net (not Bagang, fixed)	5	3
Hook and Line (surface, pulled at speed)	0	90
Purse Seine	1	5

This data shows that small ***sampan*** type craft, with or without ***katinting*** outboards, are the main type of vessel used in fishing activities, and indeed for general transport also in Bokan Kepulauan especially where the area is a patchwork of small islands and road infrastructure is minimal. Hook and line is the dominant fishing gear, however most DF fishers will register as hook and line. For Banggai, the number of gill nest is quite high. This type of net was seen in all villages and according tot the FGD and other villagers was the main type of fishing gear used in Monsongan for food fish. Fish traps are also numerous, these are the small, woven types placed on the seabed, not the large static nets (***sero***) used in many other areas of Sulawesi. Note that compressors are not registered although they are quite numerous in these Districts.

A5.2.2 Land Transportation

Item	Banggai (BPS 2003a)	Bokan Kepulauan (BPS 2003b)
Public Buses/minibuses	37	0
Lorries	5	0
Pick-up trucks	8	0
Private Vehicles (4 wheels)	14	0
Motor Bikes	No data	0
Bicycles	No data	6
Length of Road Tarmac/Other	50 km / 310 km	No Data

Motorcycles are not listed, but are the most numerous form of transportation in Banggai District.

A5.3 Health Services and Sanitation

Item	Banggai (BPS 2003a)	Bokan Kepulauan (BPS 2003b)
Hospital	0	0
Clinic (Puskesmas)	1 in Banggai	1 in Bungin
Sub-clinic (Pustu- Puskesmas pembantu)	9	5
Pharmacy/Chemists Shop	7 in Banggai	0
Doctors Practice (GP)	6 Doctors in Banggai	1
Paramedic	11	None
Nurses	3	5
Midwives	19	4
Traditional Healer trained in Childbirth	15	22
Untrained Traditional Healer	50	7
Family Planning	All villages 74% participation rate	All villages 68% participation rate
Pharmacist (trained)	0	0
Sanitation (no mains drainage)	WC in 19% Households	WC in 4% of households

A5.4 Education

Item	Banggai (BPS 2003a)	Bokan Kepulauan (BPS 2003b)
Nursery School (under 6)	3 (Private) (13 teachers)	0
Primary School #	35 (1 Private) (204 teachers)	17 (58 teachers)
Middle School	8 (5 private) (119 teachers)	3* (20 teachers)
High School	3 (2 Private) (62 teachers)	0
Further Education Institute	0	0

at least one in each village * 1 Private School in Kaukin, 2 State schools in Bungin. In order to progress beyond Middle School, children must go to Banggai or even further afield.

A5.5 Other Infrastructure

Item	Banggai (BPS 2003a)	Bokan Kepulauan BPS 2003b)
Passenger/Cargo Boats with Registered Tonnage (larger)	No data	20
Other Passenger/Cargo Boats (smaller vessels)	No data	18
Number of Vessels above which qualify as Public Transport	No data	34
Mains Water	Supply to 1216 homes 15%, all near Banggai	None
Mains Electricity	28 PLN Installations # 37% Households	None
Other (Private) Electricty	4 Villages with private electricity sources 3% households	730 Households = 32%
Communications	444 Telephones * 46 other Radio-communications devices * 497 Radios 1337 Televisions	No Telephone 159 Radios 8 Public Televisions 64 Private Televisions

* All in Banggai # At least one in every village

Infrastructure in Banggai in general is relatively poor, but in Bokan Kepulauan it is very poor.

A5.6 Economic Activity

Item	Banggai (BPS 2003a) (except Fisheries produce)	Bokan Kepulauan (BPS 2003b)
Co-operatives	1 in Tinakin Laut 7 in Banggai	1 in Bungin
Market		1 weekly in Bungin
Other services	58 shops * 324 ***Kios*** 43 Food/Drink providers* 3 Guest House/Hotels*	73 ***Kios*** 3 food/drink providers No guest houses/hotels
Industry/Crafts	63 weaving/mat making 11 cloth weaving 5 Hairdresser/Salon * 5 Goldsmiths * 49 Tailor/Seamtress 242 Carpenter 12 Radio/Cassette repair 3 Bicycle repair * 11 Motor Cycle Repair * 0 Car repair (garage)	4 Tailor/Seamstress 1 Gold Smith 18 Carpenter/Stone mason No repair facilities
Fisheries Production in metric Tonnes (T) (for Banggai, data for first six months of 2004, data from Koperindag, provided by DKP staff)	16.5T Dried Seaweed 1.1T Lobster 0.2T Teripang 1.2T Demersal Fish 0.8T Dried Salt Fish 3.95T Sharks Fin No data on pelagic fish and other produce	211T Dried Salt Fish 10T Teripang 4T Sharks Fin No data on fresh produce or seaweed

* All in Banggai

Bungin is the Bokan Kepulauan District capital. The Bungin market is the only official market, but small occasional markets are held in other places, such as the market seen in Toropot.

A5.7 Economic Sectors (% of Regional GDP)

Item	Banggai (BPS 2003a)	Bokan Kepulauan (BPS 2003b)
Agriculture & Fisheries	58.2	68.86
Mining	0.22	0.21
Processing Industry/Crafts	2.05	3.65
Electricity & Water Utilities	0.49	0.22
Construction	1.51	0.16
Trade, Hotel & Restorant	15.7	16.16
Transport & Communications	12.17	0.73
Letting and hiring	3.45	0.72
Other services	6.65	9.73

The statistics do not differentiate between fisheries and agriculture. However it is obvious that these two form by far the major basis of the economy in both Districts, as indeed is the case for

all of Bangkep Regency. Trade is the second most important, and is largely trade in basic commodities.

A5.8 Population and Poverty Level Data

The data in the following table is for 2003 and was provided by the BKKBN. Extract from these tables and other data for each village is also available and given under the relevant village reports. This data is reputed to be the best available, as the BKKBN is the only agency whose staff actually regularly visit every home, and therefore collect primary data as opposed to extrapolation.

The low number of people per household is because of the way a household is defined, i.e. an adult or an adult couple and all their under-age children. People who would in fact usually be dependants of or live with other family members in a joint home (old people, whether single or a couple, single youngsters, young married couples with no home of their own living with parents, childless widows or widowers etc) count as households in their own right.

A5.8.a Population Data for Bokan Kepulauan:

(i) General Population & Household Data

Item	Bokep		Panapat		Toropot		Remarks
	Number	%	Number	%	Number	%	
No of Households	2,420		386		295		
Population	9,520		1,648		1,242		
Gender of Household Heads							% households
Male	2,167	90%	350	91%	272	92%	
Female	253	10%	36	9%	23	8%	
Marital Status of Household Heads							
Married	2,082	86%	339	88%	267	91%	
Single/Divorced/ Widowed	338	14%	47	12%	28	9%	
Work status of wife or female household head (if applicable)							
Working	211	9%	41	11%	6	2%	
Not Working	2,007	83%	313	81%	289	98%	
Sex of Household members							% population
Male	4,775	50%	821	50%	648	52%	
Female	4,745	50%	827	50%	594	48%	
Sex Ratio	0.99		1.01		0.92		F/M
Number of people who have a birth certificate	972	10%	357	22%	0	0%	% population
Number of people who have a KTP (identity card)	1,932	20%	354	21%	314	25%	

This data shows that Bokan Kepulauan has a relatively small population, with a relatively balanced sex-ratio and very low compliance with administrative requirements such as birth certificates and identity cards. Few women have recognised occupations, though many take part in farming , fishery related (fish selling, drying etc) or other livelihood activities even though not regularly.

(ii) Age Class Data:

Age Group	Bokep		Panapat		Toropot	
	Number	%	Number	%	Number	%
0-4 years old	1,278	13%	316	19%	156	13%
5-6 years old	406	4%	69	4%	66	5%
7-15 years old	2,389	25%	513	31%	322	26%
16-21 years old	882	9%	179	11%	127	10%
21-59 years old	4,231	44%	509	31%	519	42%
60 and over	334	4%	62	4%	52	4%

This data shows a population profile with a high proportion of working age members and high numbers of young people about to enter the work market and to become parents.

(iii) Welfare/Wealth Category Data

Official Welfare Category	Bokep		Panapat		Toropot	
	Number	%	Number	%	Number	%
Pra-sejahtera (economic)	1,363	56%	262	68%	116	39%
Pra-sejahtera (other reason)	77	3%	2	1%	18	6%
Sejahtera I (economic)	354	15%	75	19%	94	32%
Sejahtera I (other reason)	116	5%	6	2%	27	9%
Sejahtera II	455	19%	36	9%	32	11%
Sejahtera III	53	2%	5	1%	6	2%
Sejahtera III+	2	0.1%	0	0%	2	1%

This data shows that the vast majority of the population are either below (45%) or only just above (41%) the official poverty line. The two target village have below average numbers of the Sejahtera II class - better off people. Panapat has particularly high numbers of poor people. A graphic representation in Figure A5.1 gives a better idea:

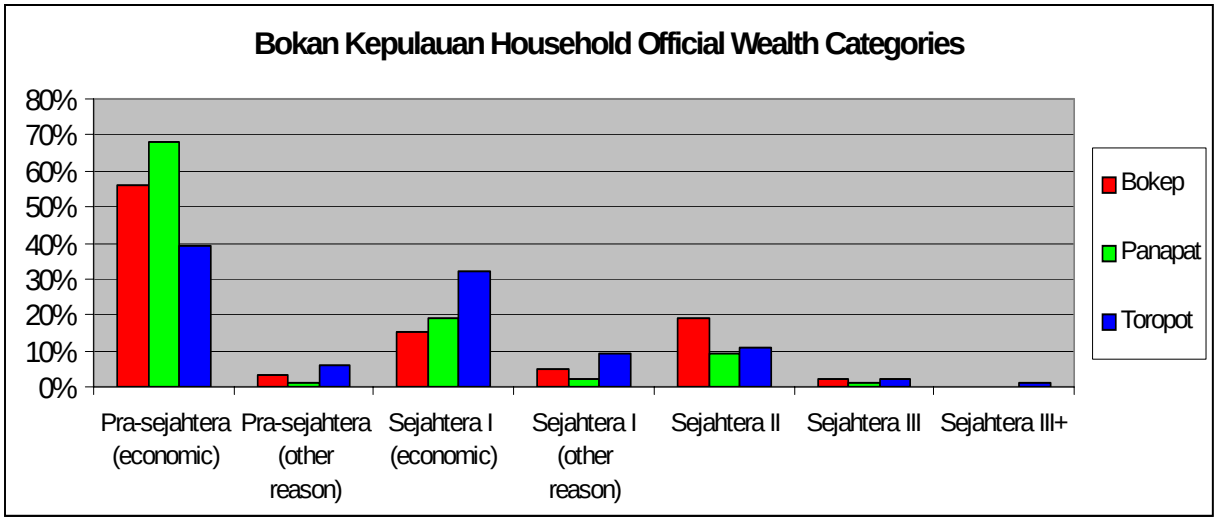


Figure A5.1 - Wealth/Welfare Levels in Bokan Kepulauan District

(iv) Education Data:

Item	Bokep		Panapat		Toropot		Remarks
	Number	%	Number	%	Number	%	
Level of Education of Household Heads							% Households
Didn't Graduate Primary	216	9%	36	9%	12	4%	
Pimary or Middle School	2,003	83%	327	85%	275	93%	
High School or above	207	9%	23	6%	8	3%	
Children aged 7-15 attending school	2,013	84%	383	75%	281	87%	% Children
Boys	1,022	83%	211	77%	132	83%	% boys
Girls	991	85%	172	72%	149	91%	% girls
Children aged 7-15 not attending school	376	16%	130	25%	41	13%	% Children
Boys	203	17%	62	23%	27	17%	% boys
Girls	173	15%	68	28%	14	9%	% girls

Most children achieve literacy and numeracy but few go on to high school. More boys than girls drop out of school very early, because they can more easily earn money.

(v) Reproductive Data

Item	Bokep		Panapat		Toropot		Remarks
	Number	%	Number	%	Number	%	
Number of Women of Reproductive Age	2,329	24%	423	26%	309	25%	% population
Number of Couples of Reproductive Age (PUS)	1,732	83%	277	82%	234	88%	reproductive /married
PUS under 20 years old	140	8%	41	15%	13	6%	% PUS
PUS 20-29 years old	792	46%	102	37%	121	52%	
PUS 30 years old and over	800	46%	134	48%	100	43%	
Number of PUS couples using the Family Planning	1,078	62%	226	82%	110	47%	
Families not using the Family planning :	654	38%	51	18%	124	53%	
Wife pregnant	127	7%	23	8%	21	9%	
Want children	384	22%	19	7%	62	26%	
Don't want children	143	8%	9	3%	41	18%	
Unmarried women of reproductive age	597	26%	146	35%	75	24%	% reproductive age women
Unmarried women of reproductive age		6%		9%		6%	% population

The data shows a very high family planning participation level in Panapat but low in Toropot. It is felt this is due to the attitude of village leaders but also to ethnic considerations.

A5.8.b Population Data for Banggai:

(i) General Population & Household Data

Item	Banggai		Tinakin Laut		Bone Baru		Monsongan		Tolokibit		Remarks
	Number	%	Number	%	Number	%	Number	%	Number	%	
No of Households	7,597		317		169		366		310		
Population	29,293		1,284		674		1,508		1234		
Gender of Household Heads (Female headed households have no adult male member)											% households
Male	6,838	90%	266	84%	149	88%	326	89%	295	95%	
Female	759	10%	51	16%	20	12%	40	11%	15	5%	
Marital Status of Household Heads											
Married	6,534	86%	260	82%	145	86%	321	88%	289	93%	
Single/Divorced/Widowed	1,063	14%	57	18%	24	14%	45	12%	21	7%	
Work status of wife, mother or female household head (if applicable)											
Working	3,980	52%	39	12%	18	11%	354	97%	5	2%	
Not Working	3,613	48%	271	85%	162	96%	0	0%	299	96%	
Sex of Household members											% population
Male	14,888	51%	628	49%	340	50%	749	50%	686	56%	
Female	14,405	49%	656	51%	334	50%	759	50%	548	44%	
Sex Ratio	0.97		1.04		0.98		1.01		0.80		F/M
Number of people who have a birth certificate	8,380	29%	21	2%	13	2%	198	13%	20	2%	% population
Number of people who have a KTP (identity card)	3,302	11%	102	8%	81	12%	97	6%	215	17%	

The data shows that apart from Monsongan, very few women have any work outside the family. However this is not necessarily accurate as some women say they don't work when in reality they often take part in farming activities, gleaning or other activities which contribute to nutritional security if not greatly to cash incomes. In Monsongan most are either farmers or if from fisher families, take part in fishery related tasks, capture or fish selling.

(ii) Age Class Data:

Age Group	Banggai		Tinakin Laut		Bone Baru		Monsongan		Tolokibit		Remarks
	Number	%	Number	%	Number	%	Number	%	Number	%	
0-4 years old	3,808	13%	197	15%	72	11%	167	11%	215	17%	% population
5-6 years old	1,527	5%	126	10%	27	4%	89	6%	53	4%	
7-15 years old	6,536	22%	346	27%	193	29%	381	25%	234	19%	
16-21 years old	2,290	8%	102	8%	61	9%	123	8%	72	6%	
21-59 years old	13,987	48%	450	35%	282	42%	712	47%	635	51%	
60 and over	1,145	4%	63	5%	39	6%	36	2%	25	2%	

This table shows a population dominated by working age people and with many youngsters about to enter the work market and become parents.

(iii) Welfare/Wealth Category Data:

Official Welfare Category	Banggai		Tinakin Laut		Bone Baru		Monsongan		Tolokibit	
	Number	%	Number	%	Number	%	Number	%	Number	%
Pra-sejahtera (economic)	3,220	42%	176	56%	38	22%	39	11%	134	43%
Pra-sejahtera (other reason)	685	9%	63	20%	29	17%	169	46%	10	3%
Sejahtera I (economic)	1,156	15%	25	8%	46	27%	4	1%	58	19%
Sejahtera I (other reason)	1,258	17%	31	10%	31	18%	103	28%	93	30%
Sejahtera II	896	12%	19	6%	25	15%	34	9%	14	5%
Sejahtera III	325	4%	3	1%	0	0%	15	4%	1	0%
Sejahtera III+	57	1%	0	0%	0	0%	2	1%	0	0%

The official wealth category distribution shows nearly half of the population is below the poverty line (49%) and most of the remainder (32%) is only just above it. The figure of 17% in the higher welfare classes is even lower than for Bokan Kepulauan, generally considered a poorer area. Tinakin Laut, just across the Bay from the Regency offices has the highest poverty level, despite having good access to Banggai and an active port, and is rivalled by Tolokibit, with much poorer access to many facilities. Monsongan has a most unusual profile, with non-economic reasons for "pra-sejahtera" dominating, while Bone Baru has relatively low poverty levels. The graph below gives a clearer perception of the overall and relative wealth/welfare distribution.

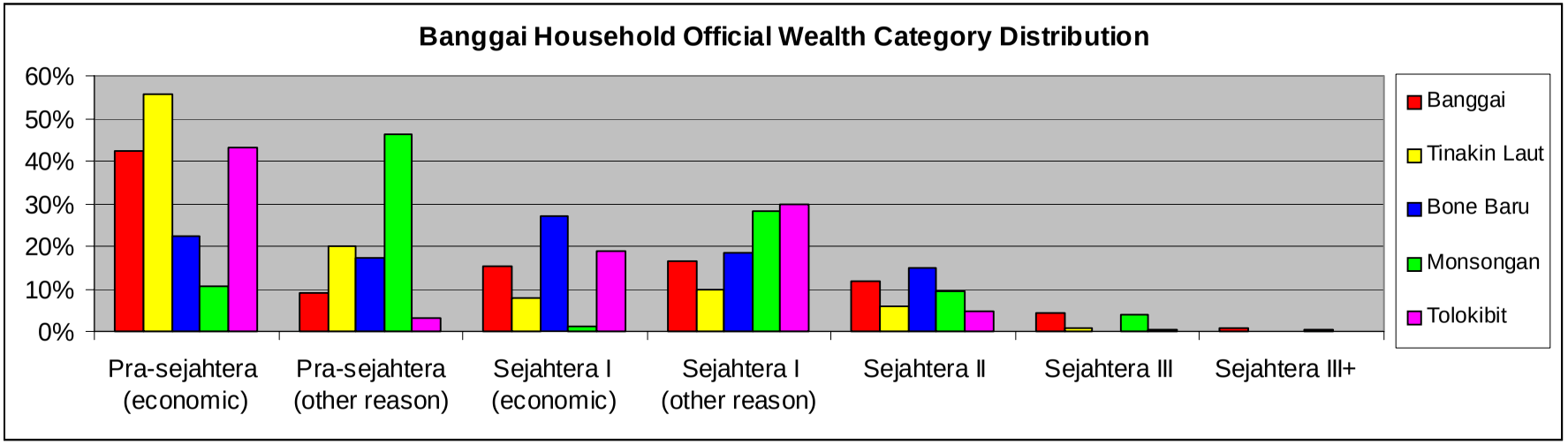


Figure A5.2 - Wealth/Welfare Distribution in Banggai District

(iv) Education Data

Item	Banggai		Tinakin Laut		Bone Baru		Monsongan		Tolokibit		Remarks
	Number	%	Number	%	Number	%	Number	%	Number	%	
Level of Education of Household Heads											% Households
Didn't Graduate Primary	1,280	17%	99	31%	20	12%	113	31%	53	17%	
Primary or Middle School	4,903	65%	173	55%	117	69%	224	61%	236	76%	
High School or above	1,414	19%	45	14%	32	19%	29	8%	21	7%	
Children aged 7-15 attending school	5,631	86%	272	79%	170	88%	323	85%	183	78%	% Children
Boys	2,863	85%	125	70%	88	90%	173	84%	103	77%	% boys
Girls	2,768	88%	147	88%	82	86%	150	86%	80	79%	% girls
Children aged 7-15 not attending school	905	14%	74	21%	23	12%	58	15%	51	22%	% Children
Boys	521	15%	53	30%	10	10%	33	16%	30	23%	% boys
Girls	384	12%	21	13%	13	14%	25	14%	21	21%	% girls

The education data shows that few people over all continue to high school or beyond. However, it is noticeable that Bone Baru with the higher educational attainment figures (adults and children) also has a higher wealth ranking. The low school drop-out figures could be at least partly due to the informal schooling available up to Middle School level there.

(v)Reproductive Data

Item	Banggai		Tinakin Laut		Bone Baru		Monsongan		Tolokibit		Remarks
	Number	%	Number	%	Number	%	Number	%	Number	%	
Number of Women of Reproductive Age	7,733	26%	378	29%	184	27%	428	28%	271	22%	% population
Number of Couples of Reproductive Age (PUS)	5,666	87%	242	93%	136	94%	299	93%	243	84%	reproductive /married
PUS under 20 years old	1,329	23%	15	6%	8	6%	5	2%	23	9%	% PUS
PUS 20-29 years old	2,394	42%	96	40%	56	41%	148	49%	105	43%	
PUS 30 years old and over	2,943	52%	131	54%	72	53%	146	49%	115	47%	
Number of PUS couples using the Family Planning	3,914	69%	192	79%	94	69%	212	71%	145	60%	
Families not using the Family planning :	1,752	31%	50	21%	42	31%	87	29%	98	40%	
Wife pregnant	313	6%	18	7%	6	4%	12	4%	12	5%	
Want children	1,053	19%	23	10%	28	21%	47	16%	74	30%	
Don't want children	386	7%	9	4%	8	6%	28	9%	12	5%	
Unmarried women of reproductive age	2,067	27%	136	36%	48	26%	129	30%	28	10%	% reproductive age women
Unmarried women of reproductive age		7%		11%		7%		9%		2%	% population

The family planning system seems to be working well, as few couples who do not currently want children are outside the system (4 - 9%). There is a high proportion of unmarried women of reproductive age. Many of these women will be considered "households" and will often be particularly poor.

Appendix 6 - Official Definition of Wealth Categories[5]

1. Pra-Sejahtera (Poor):

A family who are not (or not yet) able to provide for their minimum requirements, as outlined in Sejahtera I below.

Note: from a discussion with the BKKBN staff, regarding general criteria and referring to particular cases, it seems the three main criteria are the ability to provide themselves with decent food, decent clothing and decent accommodation - as per official perception of decent (***layak***). If two of these are met but not all three, there is some discretion as to whether the family is classed as Pra-sejahtera or Sejahtera I. Only Pra-sejahtera families receive subsidised rice and free health care, so it is an important distinction. When more than one "household" shares the same house, they may be classed differently according for example to who owns/built the house, provides the income etc.

2. Sejahtera I (Just above the poverty line):

A family who are able to provide their basic requirements including clothing, food and shelter and basic health care. The 4 basic indicators used are as follows:

- All family members eat a nutritious meal at least twice a day on a regular basis
- All family members have clothes (different sets) for home, school/work and social events/travelling
- Most of the floor at least is covered in boards (or better) in good condition (not broken, worm eaten etc), i.e. not beaten earth
- If a family member is ill, he/she is taken to a source of modern health care (e.g. a clinic, not a ***dukun*** - a type of traditional healer/shaman)

3. Sejahtera II (Comfortable)

A family who can provide for the minimal requirements as above, and in addition can full-fill their basic social and psychological needs, but still cannot full-fill a need for personal growth. There are 8 additional criteria:

- At least once a week the family can eat meat or eggs as their protein source
- Each family member has had at least one new set of clothes in the last year
- The floor area of the house is at least 8m² per household member
- All household members between 10 and 60 years of age can read using the latin alphabet
- All children between 6 and 12 years of age attend school
- At least one household member over 15 years of age has regular work
- All family members have been in reasonable health for the last month, so that they are able to carry out their respective tasks
- The household members worship in a regular fashion according to their declared religion

[5] From the BKKBN definitions, as reproduced for social-economy students at Alkhairaat University

4. Sejahtera III (Quite Well Off/Well Off)

A family which can full-fill the criteria above and in addition the criteria below, but is not yet active in carrying out social duties in the area:

- Only have two children at most OR if, there are more than 2 children:
- Then the family must be able to save a portion of family income on a regular basis
- The family usually eat together at least once a day
- The family are usually involved in local activities
- The family has some form of recreational outing at least once every 3 months
- The household receives news from the press or radio
- The family members are able to use transport which is appropriate to the area they live in (not clear whether this means vehicle ownership or regular use of public transport)
- The family members take steps to increase their knowledge in religious matters

5. Sejahtera III plus or IV (Well Off /Rich)

Qualify for all the criteria above and in addition:

- Give regular donations to charity or make contributions (in cash or in kind - but material goods, not just labour/time) to social undertakings in the area (or further afield)
- Are active in local (or wider) organisations such as Yaysans (NGOs), social groups, or other institutions on a voluntary basis.

Appendix 7 - Videos

Annotated List of Contents

A7.1 Land-based Films

1. Banggai Presentation Harbour & Bay

- Banggai Bay from Regency Offices.
- Banggai Bay Heading North - en-route to Bone Baru.
- Banggai Bay Heading South - direction towards Monsongan, Pearl Farm and Bokan Islands, taken en-route to the Pearl Farm.
- Banggai Harbour & Fisheries Speedboat - Panorama and team onboard.
- Presentation to Regent and Fisheries Department - Presentation regarding the EC-PREP programme, and our Case-Study, also including Banggai Cardinal Fish Information.

2. Bone Baru

- Arrival at Bone Baru - general view of the beach/harbour and team going ashore.
- Bone Baru Bay - approaching the village across the Bay.
- Bone Baru BBI & Dusun II - the hatchery and nearby sub-village from the sea - this area was part of the manta tow area, to the left is Toulon Island.
- Bone Baru House of Sekdes - the house of the Village Secretary, the Village Heads second-in-command and the main road which goes past the house.
- Bone Baru Packing BCF for loading on KM Sinabung.

3. Coastline

- Bokan Island North of Panapat - passed on the way to Panapat village, note the bare earth visible on the recently cleared hills.
- Coast South of Banggai - taken when heading to Bokan Kepulauan.
- Coast North of Banggai - taken when heading to Bone Baru.
- Fisheries Department Speedboat - team onboard with Pak La Ana driving, on the way to Bokan Islands.
- Toulon Besar & Toulon Kecil Islands - taken en-route to Bone Baru, South of the BBI

4. Pearl Farm

- Arrival at Pearl Farm - first try, met by the son of the owner, who sent us back to get permission form his father in Banggai. The shed visible to the right was later found to have two captive adult (around 60-70cm carapace length) hawksbill turtles.
- BCF around Jetty & House at Pearl Farm - at once we noticed the BCF in large numbers all around the Pearl Farm base-camp and harbour structures.
- Fish in LRFT pens - these pens were full of hundreds of fish, mainly *Cheilinus undulatus*, the Napoleon Wrasse. Other species included snapper (Lutjanidae), sweetlips (Haemulidae) and grouper (Serranidae).
- LRFT pens - a view as we arrived.

- Pearl farm Bay from House - a panorama from the Pearl Farm base-camp house balcony.
- Pearl Farm Bay - a panorama taken as we entered the Bay from Banggai

5. Tinakin Laut & Monsongan Typical Bajo Villages

There is only one short clip available for Monsongan. Although Tinakin is at present not active in the ornamental fish trade, the village was one of the original centres of the trade. The conditions in this Bajo village are typical of many other villages throughout the Archipelago, including those visited by the team (Monsongan, Toropot, Liang Bajo sub-village, parts of Panapat and Bone Baru villages).

- Monsongan Village panorama.
- Arrival Tinakin Laut and Island - to reach the Bajo village from the harbour area where the public minibus dropped the team, it was necessary to climb over a steep hill, from where the whole village and the island opposite could be seen.
- Climbing over the hill to Tinakin Laut - not an easy route!
- Tinakin cleaning food fish - after the best fish are sold, these small fish are kept for the fisher families to eat.
- Tinakin dried fish, shells and cakes - dried salt fish like these are produced in all villages visited. The helmet shells are used as "horns" to call people to buy fish, they are also displayed as ornaments in people's homes. The cakes are made and sold every day during Ramadan, to open the fast at sunset.
- Tinakin Laut BCF Breeding Pen - Pak Mudir the village head said that he was keeping the BCF in this pen in order to breed them and to increase the population. There were urchins and other organisms which had established themselves, according to him without assistance, so from larval settlement? It is not clear if this is the real reason for the pen and if it is, whether it will be effective. However if Pak Mudir really wishes to restore the populations, this is an excellent opportunity for positive intervention.
- Tinakin Laut small Jetty - this is typical of the small landing stages found in Bajo villages throughout the Archipelago.
- Tinakin Typical Bajo Houses - these are typical of Bajo houses in the Banggai Islands.
- Tinakin Village Heads House - the poster on the wall was given by the previous BCF researchers, Kristin Lunn and Marie-Annick Moreau, who stayed in Tinakin for around 10 days in 2001, making it their base for the Banggai Island part of their survey.

A7.2 Underwater and In-water Films

1. Bone Baru

- Cyanide Fishing Demonstration - preparation of the cyanide in a squeezy bottle, method of applying the cyanide and subsequent capture, using a ***Bundre*** type net.
- Transect I Headland - footage of the transect placed near the Headland to the West of the village, just South of the reef tip towards the BBI. The clips show the general condition of the area and BCF population as well as a panorama of the area and the team at work.
- Transferring BCF to Keramba - a fisherman unloading his catch into the holding pen.

2. Monsongan

- BCF Capture with Cang - footage of the BCF capture method used in Bone Baru when only one fisher is involved.
- Keramba and Holding Ponds - BCF in the keramba, recapture of BCF which were released in to the "empang" or holding ponds between the houses, made by closing off sections of the waterways between the houses with coral rock walls. These ponds are not cemented, so the water rises and falls with the tide.
- Reef and Bay - a panorama of Monsongan Bay with team at work, and footage of the general condition of the coral reef (mainly the better areas), with some BCF visible.

3. Panapat

- Tj Nggasuang Reef Crest - footage of the reef crest on the outside of the lagoon at Tanjung Nggasuang, the capture location to which the team was taken by the Panapat Village Head Pak Rahman. This was the best coral we saw during the survey, and much of it would be under GCRMN condition category Very Good or 76-100% live hard coral cover.
- Tj Nggasuang Lagoon BCF Fishing Ground - This location is fished on rotation, every few months, and is also used as a seaweed farming area. The high population of BCF and lack of any signs of significant damage to the substrate show that BCF collection can be sustainable and can also be compatible with other economic activities such as seaweed farming. The footage shows a panorama with the team at work (it was low tide at the time) and footage of the underwater condition, including some very dense BCF aggregations, with all size classes present.

4. Pearl Farm

- BCF outside transects - the BCF populations were substantial in the diadema colonies around the harbour area and on the sandy bottom of the bay at around 3m depth. The latter could not be surveyed with snorkel gear, as the tide was rising. As well as in diadema colonies, BCF were observed in a number of other habitats, including several type of anemones (mainly *Stychodactyla sp. and Heteractis sp.),* branching acropora, branching and semi-massive fire coral (*Millepore sp.*) and the mushroom coral *Heliopora sp.*
- Harbour area and Panorama - footage of the underwater fauna around the harbour including BCF, and of the area with team at work.
- Transect 2 - footage of the area within transect 2 survey area. Note that for Transect 3 only still photographs were taken, and the underwater camera was not taken to Transect 1 as it was used at Transect 2, both being surveyed simultaneously.

5. Tinakin Laut

- Tinakin Captive Lobsters - lobsters awaiting sale, one livelihood strategy in Tinakin.
- Tinakin from Island to Harbour - this film shows most of the return swim from the Island to the harbour, with very few BCF and many Diadema. According to the Village Head Pak Mudir, once almost all diadema colonies had BCF living in them. Between Tinakin Village and the Island opposite, over 80% of colonies were like this one - no BCF - even though apparently it is some time since there was any capture here.
- Tinakin Harbour BCF - this colony was near the base of the harbour wall, more BCF were in the diadema colonies among the harbour wall stones, similar to the Pearl Farm wall, but the films did not come out well.

- Tinakin Lion Fish - some fishermen, mainly in Bone Baru, had been offered a good price (5,000 Rp, or over 16 times the price for a BCF) for capturing one of these by the ornamental fish buyers from Tumbak, but because of the potent poison in it's deceptively delicate looking spines, they were not willing to take the risk.

6. Toropot

- Toropot BCF Capture - footage of capture using a Cang net and the special net only seen at this location, the looks like loosely strung racket.
- Toropot before and after Capture - footage of BCF in anemone and seagrass habitats before capture, and of handling BCF post-harvest. The fish are sorted and only those of marketable size are kept. The eggs are expelled from the mouth pouches of brooding males of marketable size. Expelled egg masses counted at this and other locations were found to consist of between 35 and 50 eggs, some almost ready to hatch. These eggs are quite small and red, so probably only a few days old.

7. Tolokibit

- BCF Holding Pen Tolokibit - film of BCF awaiting collection - buyer from Palu ordered their collection then didn't come for them.

Appendix 9 - KI and FGD participant details

A.9a - Key Informants (KI)

Government (PNS): Non- Fisheries

No.	Name	Position	Remarks/Information
1	H. Ali Hamid SH	Bupati - Regent	Policy, Support
2	Drs Zakariah Kamindang	Sekab - highest Regency level career civil servant (PNS)	Policy, OFT information, Development information, Support
3	Dr Syahrullah K. Ngongo M. Kes.	Kadis - Head of Health Department	State of health care, history & visions for the future; oxygen supplies; welfare/poverty issues
4	Pak Ramli	Health Admin Staff	
5	Pak X Bailia	Kadis - Head of Family Planning and Population Data	Data on poverty; population data; family planning and welfare issues; suggestions for relieving poverty
6	Pak Guzaif Dunggio	Banggai Clinic senior paramedic (and radio/printed bulletin co-ordinator)	Health services & health/welfare issues, local media, use of Puskemas vehicle to Bone Baru, Motor Bike to Monsongan
7	Pak Mohammad Aris	Trade & Industry Department, senior technical staff	Proper procedures for licensing and retributions, the current situation, and suggestions for improvement; also information on Bone Baru
8	Ibu Ramla S. Hasan	Bidan Desa (midwife/nurse) in Bone Baru	Health issues in Bone Baru, water supply problems, seasonal information (wife of Pak Moh. Aris)

Government (PNS): Fisheries Department (DKP) in Bangkep

No.	Name	Position	Remarks/Information
1	Ir. Ramto Datuage	Kepala Dinas DKP	Support, OFT and other fisheries information, BBI information,
2	Drs Kornelis Yabie	Head of Programmes	
3	Sangihe Lasiha SPi	DKP Senior Staff	
4	Ibu Wiwi	Administration	Capacity (human, facilities etc), current and planned activities and extension programmes
5	Pak Saud	Surveillance	Surveillance & Enforcement, role, capacity (limitations), community programmes, plans and suggestions
6	Pak Faisal	Data Management	Data related issues, actual data, Fisheries High School, social issues, extension programmes, suggestions

Government: Karantina in Luwuk (comes under DKP, Provincial/National, covers 5 Regencies including Bangkep)

No.	Name	Position	Remarks/Information
1	Pak Amsal	Technical Staff	The role of Karantina, in theory and reality. The history, duties and capacity of the Luwuk Branch which covers 5 Regencies including Bangkep. Their experience with OFT, information on Palu-based trader Pak Nyoman. Suggestions.
2	Pak Darmawan		
3	Pak Marlan		
4	Pak Moh. Zamrud (Liang)		
5	Pak Dedy Susanto	Administration Staff	
6	Pak Lamana		

Bone Baru:

No.	Name	Position	Remarks/Information
1	Pak Samsudin S. Hamid	KD - Village Head	Village profile, policy, general
2	Pak Abdul Rahman	OFC Co-ordinator	OFC and livelihood
3	Pak Ali Yasin	OFC (also co-rdinator?) Leader in the fishing community	OFC and livelihood Potas (cyanide) use
4	?? Ask Sita	Wife of Sekdes	Womens issues
5	Unknown	Dried fish trader	Other livelihood options
6	Unknown	Kios owner	Finances, livelihoods

Monsongan:

No.	Name	Position	Remarks/Information
1	Pak Ahmad P. Rajab	KD - Village Head	State of welfare in village, infrastructure and services, access to education, poverty problems, problems with aid projects etc
2	Pak Muslim A.K	Sekdes	Village Data (not copied!)
3	Ibu (see photo)	Padola - fish trader	Fisheries, women's issues
4	Pak Guhuddeng & Ibu Sinarti	OF fisherman + wife (9 children, 1 married with 1 child)	Livelihood options, everyday challenges, aid project problems, health issues, suggestions
5	Hj Umrah	Collector/financier	OFT, financial issues
6	Unknown	Kios owners	Triangulation, financial and livelihoods information

Tolokibit:

No.	Name	Position	Remarks/Information
1	Pak Husein Malila	Village Head	General village information, facilitation to meet Sekdes
2	Pak Basrun Sasada	Sekdes, OF fisher and OFT co-ordinator	OFT history, techniques, extent, organisation, social aspects, other livelihood options
3	Unknown (see photo)	Kepala Dusun, sub-village head	Conditions and programmes in Tolokibit fishing sub-village

Tinakin Laut:

No.	Name	Position	Remarks/Information
1	Pak Mudir	KD - Village Head	Village OFT history, general

Panapat:

No.	Name	Position	Remarks/Information
1	Pak A. Rahman L. Katjiak	KD - Village Head & OFC Co-ordinator	Village profile, policy, OFT, general and livelihood

Toropot:

No.	Name	Position	Remarks/Information
1	Pak Dayu	Fishermen's Leaders and co-ordinators of OFT	OFT, social and livelihoods
2	Pak Supriadi		
3	Unknown	Seaweed Farmer	Other livelihoods
4	Guides, Unknown	Three fishermen	OFT, especially collection

Liang:

No.	Name	Position	Remarks/Information
1	Pak Kasman Sawiyo SPd.	SMK Headmaster	Environment, Education, etc
2	Rusdin Sinaling's family and local Youth Group Members	Local residents	History of OF capture, environmental problems, general

Other:

No.	Name	Position	Remarks/Information
1	Pak La Ana	DKP Boat Driver	OFT, geophysical
2	Unknown, met on Salaka Ferry	OF collector's friends	OFT via KM Sinabung from Toropot/ Bokan Kepulauan
3	Unknown	Pearl Farm Owner & Sons (one recently graduated in Fisheries)	BCF populations, local issues and attitudes, history of OFT , OFT now, concerns re future
4	Unknown	Toropot-based Manadoese met on Ferry to Luwuk	OFT trade routes and issues
5	Unknown, friend of Pak La Ana	Bebang villagers	OFT trade and issues, triangulation
6	Pak Hasan Laminula SH. MM	Head of Banggai Branch of BPD	OFT financing - Panapat already, wants to do more
7	Pak Awi, SH	Head of KNPI and a lawyer (LBH experience)	Fisheries infractions, legal viewpoint and suggestions
8	Unknown	Jakarta Consultant (Evaluating PKK aid programme in Bangkep)	Views on development programme effectiveness and the hurdles to poverty alleviation

A.9b - Bone Baru FGD Participants:

No.	Name	Education	Years in OFC/Remarks
1	Abdul Rahman	Unknown	Coordinator
2	Ali Yasin	Primary School - SD	DF demo Possibly also coordinator?
3	Nasrudin	Primary School - SD	DF demo
4	Saharudin	Primary School - SD	
5	Hamsin	Primary School - SD	3
6	Hariyadi	Primary School - SD	6
7	Anjas	Middle School - SMP	
8	Nurman		
9	Mudin		
10	Sahim		
11	Hamir	Middle School - STM	
12	Jasman	Middle School - SMP	
13	Samsur	High School -SPMA	
14	Hasmir		
15	Sukman		
16	Hatis		
17	Harjun	Primary School - SD	
18	Ali		
19	Ale		
20	Hasria		
21	Hamzah		

A.9c - Monsongan FGD Participants

No.	Name	Remarks
1	Ny Umar	Woman, husband also in OFC
2	Ismail	Unmarried, lives with parents (7+ live in house, 4 generations including grandparents, parents, siblings, one married with 1 child)
3	Wisnu	
4	Tamia	Woman, husband also in OFC
5	Sudin	
6	Sapri	
7	Enu	
8	Jaidin	
9	Lilis	Woman, husband also in OFC
10	Kardi	
11	Mus	
12	Usung	
13	Djuhuden	
14	Ayu	Woman, husband also in OFC
15	Rasiun	Local Collector
16	Herdi	
17	Arjan	
18	Umrah	Hadji, Local Collector Lives with wife and 3 children (5)
19	Darman	

A.9d - Panapat FGD Participants

No.	Name	Remarks
1	Tamin	Head of Fishermen's Group
2	La Negong	All attended Primary School Most Graduated All are Literate and Numerate
3	Bombo	
4	Amis	
5	Larima	
6	Muchtar	
7	Laeve	
8	Pardin	
9	Lakabo	
10	Ambo	
11	Hasmadi	
12	Larasi	

Appendix 10 Equipment used in OFC (technical details and costs)

Most of the equipment used in OFC is similar for every village visited. Prices given are also fairly standard, though of course subject to variation.

A10.1 Mode of transport

The fishermen all use ***sampan*** or similar craft. Sample sizes are given in Table A10.1 below:

Table A10.1 Typical Fishing Boat Measurements

No.	Village	Length (m)	Width (cm)	Height (cm)
1	Monsongan 1	6	70	65
2	Monsongan 2	5.6	48	42
3	Bone Baru 1	6.8	58	50
4	Bone Baru 2	5.6	48	42
5	Panapat	6.7	36	65
6	Typical	5 - 7	± 40 - 80	± 35 - 70

Typical Costs:

- The sampan will cost around IDR 1,000,000, or ± 133 US$.
- An oar costs around IDR 25,000. At least two will be needed (for the boat and OFC), ± 6.7 US$
- If a ***katinting*** long-shaft outboard is fitted, it will cost around IDR 2,500,000. or ± 333 US$ for the 5.5 HP model, the most common size, and up to IDR5,000,000 or ± 666 US$ for larger more powerful engines. Sometimes two engines are fitted for larger craft and/or longer journeys.
- Fuel: Local fishing will use around 2-3 litres of fuel, an average trip may consume 5 litres (Panapat), 7 litres (Monsongan) to 10 litres (Bone Baru). Long-distance trips (e.g. Bone Baru to Popisi) may use substantially more. Fuel costs around 2,500 IDR/litre in Banggai and around 3,000 IDR/Litre in Bokan Kepulauan. So fuel costs will range from IDR5,000 to over IDR30,000. per trip, ± 0.67 to 4 US$.

A10.2 Nets and Net Accessories

The main types of nets used are shown in Figures A10.2.a to A10.2.b, with typical dimensions. Photographs and video of Cang and Bundre nets and the racket type which was seen in Toropot are shown in Appendix 7 and 18. The other net types are a small collapsible fan-shaped net (***seser***) similar to a miniature version of the push-net used for catching ***nener*** (milkfish fry), and a small barrier net (***jaring kelambu***) with weights and floats, both made of a fine but permeable material similar to mosquito netting. This type of material is not available in Bangkep, indeed would be very hard to find (if at all) for sale anywhere in Central Sulawesi. These nets are used in Panapat but are brought by the Balinese buyers boat and not left with the collectors, so the team could not see them. However a team member has seen similar nets in operation in the Philippines.

Typical Dimensions:
- Diameter: 40-50 cm
- Length: 60-80 cm

Typical Cost:
- IDR 30,000
- ± 4 US$

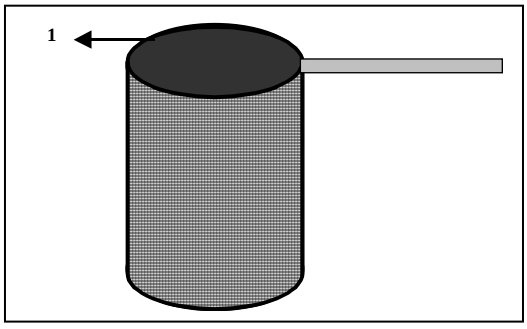


Figure A10.2.a - Bundre (All except Panapat)

Typical Dimensions:

1. Pocket : 40 X 40 cm wide
   50 - 60 cm depth
2. Wings: 1.8 m - 2 m long
   40 cm wide
3. Weights: 25-30 small weights
   ± 20 - 25 cm apart
4. Floats: 25 - 30 small floats
   ± 20 - 25 cm apart

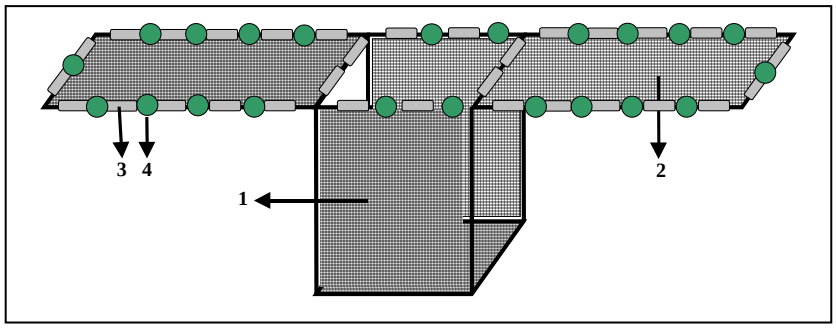
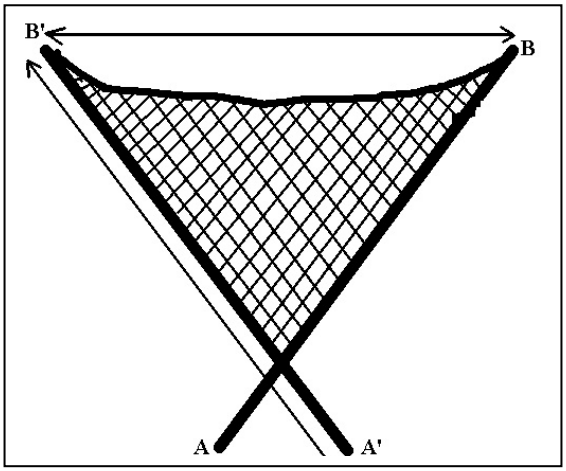
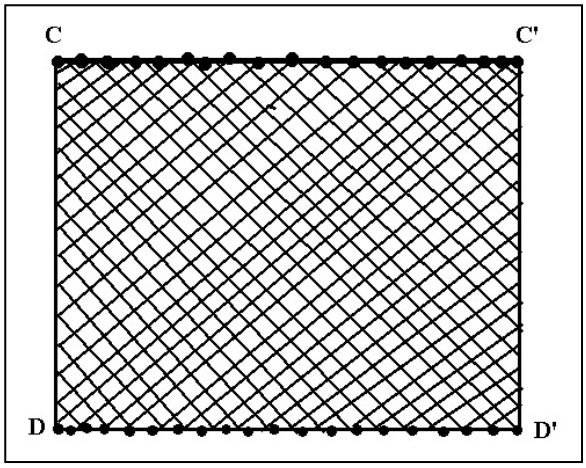


Figure A10.2.b - Cang (All except Panapat)

Typical Cost:

- Floats are often made from old rubber "flip flop" or "thong" type sandals, so are usually free.
- The net and weights have to be purchased.
- The cost of making a Cang is between IDR 50,000 and IDR 100,000. or ± 6.7 to 13.3 US$.





Seser Typical Dimensions:

- AB/A'B' = 1 m
- BB' = 75 cm

Kelambu Typical Dimensions

- CC'/DD' = 1.5 m
- CD/C'D' = 2 m

Figure A10.2.c Seser & Jaringan Kelambu (Panapat)

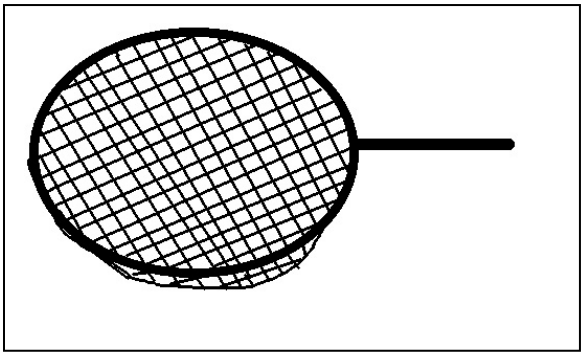
These nets are provided by the buyers and only loaned to the local fishermen, however a price of IDR 25,000 or ± 3.3 US$ was given for the Jaring Kelambu. If the material were available, the local fishers could make them themselves.

Typical Dimensions:

- Diameter of Net: 40 - 45 cm
- Length of Handle: 40 - A100 cm

No cost available.

Net used is very fine mesh, much finer than for Cang or Bundre, but not as fine as the nets from Bali. Colour is green or black.



F*igure A10.2.d - Racket type net (Toropot)*

A10.3 Keramba - Holding Pen

The holding pens in Monsongan were similar, and were measured (Figure A10.3.a)

Typical dimensions were:

- Depth: 100 - 150 cm
- Width 1: 75 - 90 cm
- Width 2: 100 - 115 cm

Typical Costs were not given, but based on the Dimensions and cost per meter of 50 cm wide net (IDR7,000 to IDR10,000), the ***keramba*** could be constructed for around IDR200,000 to IDR300,000 including Bamboo, weights etc., ± 27 to 40 US$.

Figure A10.3.a - Measuring Keramba

In Bone Baru, the holding pens were more varied, some similar to the Monsongan type above, some much larger, and using plastic drums with wooden frames as well as or instead of bamboo floats. Empty oil cans, polystyrene and other materials are also used. Some examples are shown in Figure A10.3.b. below.
The depth is similar, generally around 1.5 m, but the Width Dimensions vary up to around 2m X 2m, with sometimes several pens fixed together.

- The larger type using drums will be much more expensive, as each drum costs IDR150,000 to IDR 200,000.
- Estimated costs are in the range of IDR 200,000 to around IDR 2,000,000 or ± 27 to 287 US$.

Figure A10.3.b - Keramba variations at Bone Baru

No Keramba were seen in Bokan Kepulauan, and the OFT fishers there say they do not use them, as they only catch to order, and so polystyrene boxes or plastic basins are enough.

However, temporary holding cages similar to those used in the Live reef Fish Trade are sometimes used both in Toropot and in Monsongan. A picture is shown opposite.

Figure A10.3.c Bubu type holding cage at Monsongan

A10.4 Ancillary Equipment

Many types of everyday utensils, mainly household plastic items are used at various stages of the OF collection process. Illustrations of typical utensils are given below in Figure A10.4. Prices of the most common items are given in Table A10.4.

Polystyrene "Gabus" box for temporary holding/transport

Empty jerrycan with a split used for temporary holding/transport

Fine sieve for selecting and moving fish between containers

Fine mesh net used for fish transfer

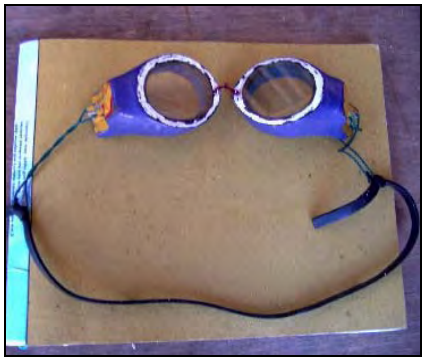
Potas and Bottle used in OFC

Small bowl used for fish handling

Gabus used for transport

Scoop used for fish transfer

Oar used in OFC



Local goggles of wood & glass

Large basin for sorting

Bucket used for storage/sorting

Figure A10.4 Ancillary Equipment

Table A10.4 Approximate cost of Ancillary OFC Equipment

Item	Price	Item	Price
Polystyrene Gabus	IDR 50,000 A10.7US$	Scoop (sometimes free)	IDR 0 to 5,000 0 to 0.6 US$
Jerrycan	IDR 25,000 3.3 US$	Small bowl	IDR7,500 1 US$
Sieve	IDR 15,000 2 US$	Larger basin	IDR30,000 4US$
Mesh net racket	IDR 10,000 1.3 US$	Bucket	IDR 15,000 2 US$
Local made goggles	IDR 10,000 1.3 US$	Diving Mask	IDR 300,000 40 US$

Re-use of damaged items/trash:

Scoops are sometimes made out of broken plastic containers, and therefore free. When fishing for ornamental fish other than BCF, and using cyanide, there is of course an additional cost of the cyanide tablets, which is unknown, however the bottles used are empty household product bottles and therefore free. Old sandals and anything buoyant can be used for floats, e.g. for capture nets and ***keramba.***

Appendix 11 - Additional Key Informant Information

A11.1 Banggai Kepulauan Marine and Fisheries Department (DKP):

Two visits were made to the DKP, on the 15th and 1 December, specifically for the purpose of obtaining data held the DKP and about DKP activities. Three staff assisted: I Wiwi (administration), Pak Mohammad Saud (Pengawasan surveillance), Pak Faisal (Pendataan = data department) . P Faisal and Ibu Wiwi also assisted with observation of BC loading on KM Sinabung (Figure A11.1)

Figure A11.1 - Pak Faisal and Ibu Wiwi of DKP

1. **Ibu Wiwi:** Ibu Wiwi provided much information on the capacity and running of DKP.

- **Mobility:** The first question put to her was about mobility, i.e. sea-going vessels. The DKP has 1 speedboat for "operasional" - field operations. Heavy running costs, much used by "***tamu***" - visitors, mainly official or research (like us) who pay the operational costs while using the boat (as we did). There are no communications equipment, GPS, or other accessories. Other speedboats in the Banggai Kepuluan Regency that Ibu Wiwi is aware of, and sometimes assist DKP in specific tasks are:

a) the PEMDA (Bupati's office) speedboat, bigger and better equipped but with VERY heavy operating costs, especially fuel, so little used

b) BAWASDA - Badan Pengawasan daerah - sort of local Government internal Watchdog, check s up on whether things are done according to the rules or not, controled by the Kejaksaan - Courts/Justice Department

c) Dinas Kesehatan - Health Department - used for transport of health equipment and personnel, emergencies etc

d) Kecamatan Bokan Kepulauan - the District has a craft, based in Bungin, used mainly for people transportation, sometimes also used by visiting officials/researchers (a group from DKP Jakarta had to use this craft during our visit as we had already been promised the Fisheries speedboat, caused some internal strife, as we overheard)

- **Back-up from the Navy:** No navy base in Banggai. When necessary, people from the Luwuk base come, on the Public Boat, they never come with a Navy vessel. Work with DKP Petugas Pengawasan - Pengawasan is surveillance and enforcement

- **Staff knowledge related to the OFT:** No DKP staff have an academic background or experience in the ornamental fish area, there used to be one staff member who did but she moved out of the area. The DKP would welcome internal capacity building in this field.

- **Extension activities:** DKP have regular training in various fields (training in seaweed farming - management aspects was going on while I was there, though the villages I visited were not invited apart from Panapat). ***Penyuluhan*** (giving of advice, which can be technical, legal/warnings, awareness building etc) is a task that is hampered by lack of funds, but the staff try. One major field is trying to reduce DF. There has not been any training or ***penyuluhan*** from DKP regarding any aspect of ***Ikan Hias*** - ornamental fish/fishing. The Monsongan "***penyuluhan***" referred to by the FGD participants was that by the programme of Lunn & Moreau with the Luwuk-based NGO YPL, the DKP merely accompanied them.

- **Material aid:** aid given by the DKP to fishing communities is always to groups (***kelompok***) not individuals. Most aid is intended to reduce DF rather than targeting poverty. Most is not very

successful. Boats and engines (usually ***katinting*** long-shaft outboards) or other equipment such as nets (e.g. small purse seines) are distributed to groups of fishers (up to 25 people), on a "***bergulir***" or rotating basis, i.e. the first group to receive help has to pay back in instalments, so that the funds can be used to help other groups, on a continuous basis. The equipment is sometimes sold. Many fisher groups don't keep their side of the bargain (re re-payments or use restrictions) so often the equipment (or what is left of it) is re-possessed and moved to other groups/villages.

- **Reasons for failure of aid:** Ibu Wiwi thought probably poor communication (deliberate or not) between DKP and groups, or between the group leader(s) and other members is part of the problem. Poor group management and internal fraud is VERY common across Indonesia, as Ibu Wiwi admitted, and she thought nepotism is possibly a problem with the wrong people being chosen at the village level to receive aid. (It is worth noting here, that based on information from the villages it would seem the selling occurs because the recipients are often really farmers more then fishers - confirming suspicion of nepotism at local levels. Also, from the villages, many re-possessed villagers don't understand why, indeed they say procedure of warnings etc are not followed - as far as they know).
- **Surveillance:** Ibu Wiwi gave the outline of the "***pengawasan***" or surveillance system being set up, which is expected to be fully operational in 2 years time. Everything she said was confirmed later by Pak Saud, who was out at the time. The main details are:

a) A Watch Post (***Pos Pengawasan***) is being set up in each district, which will be equipped with communications equipment (some form of radio communication). The first posts have been established in the areas most at risk from Destructive Fishing (DF) and other illegal operations (including incursions by unlicensed foreign fishing vessels).

b) Each post is to be manned by local people, usually fishermen, who will have been trained by the DKP for their tasks.

c) The first group has just completed training. Trainers were from the DKP, Police, Justice Department, Armed Forces (local representative - Denramil), and other Government Departments.

d) Three posts have already been started up:

- Togon Sagu (Pulau Bangkurung)
- Bolokut (Pulau Bokan)
- Kambani (Kecamatan Buko, Pulau Peleng)

e) Two more posts are in the process of being established.

- Kalumbatan (Kecamatan Totikum, Pulau Peleng)
- Kalupapi (Pulau Bangkurung) - very high level of bomb fishing

2. **Pak Saud:** Pak Saud is the only DKP employee with responsibility for ***pengawasan*** - surveillance/security/enforcement. He aims to prevent/reduce infractions rather than heavy-handed enforcement, for which he does not have the resources anyway.

- **Role:** The three main areas are illegal fishing (including DF), illegal loading (export) of fish leaving the area, and irregularities in (or total lack of) documents, including fraudulent or faked (***palsu)*** documents. All marine species are covered, not just fin-fish, though this is the main focus. In the eyes of Pak Saud, DF = Bomb Fishing, all other types are secondary, including cyanide fishing (see below). Pak Saud feels that really at least 5 people are needed to do his job properly, but so far he is still the only one. Sometimes when he needs assistance for a particular

case he can call on temporary help from the Provincial level in Palu. These will come by public transport (land and sea), so take time as well as expenses.

- ***Pos Pengawasan* Programme:** Pak Saud sees the way forward as being through the involvement of the local communities (***berbasis masyarakat***), both for effectiveness and to palliate the lack of personnel, facilities and other resources. The District posts are being set up in all Kecamatan, step by step, except Banggai which is being handled directly from the DKP office there. All existing posts already have "***pesawat***" - radio communication facilities - and have been trained in the use of these. They also have full instructions for carrying out their duties, as well as having attended training. The tasks of the District posts include:

a) ***Melihat*** - Surveillance - keep an eye on all that is going on

b) ***Mencatat***- Record - write down what they observe

c) ***Melapor*** - Report - report to Pak Saud at the DKP and if necessary to the relevant law enforcement authority (e.g. Police)

d) ***Intervensi*** - Intervention - ONLY if supported by local legislation - which does not yet exist in almost all areas, including all areas with established posts

e) ***Penyuluhan*** - all have been trained (to some extent at least) in giving advice and explaining the problems related to DF - why it is illegal, especially what it does to the future prospects (environmental damage) and why it is in their longer-term interests to refrain from DF.

The post staff can't arrest offenders unless there are specific officially sanctioned village rules (PERDES), they need the assistance of a Police officer to arrest. The PERDES are sanctionned by the BPD - Badan Perwakilan Desa - an elected village council (which is one of the innovations since "Reformasi" and the fall of the Suharto regime).

Pak Saud is proud of the two pilot villages Masaleang and Lantibung, both in Pulau Bangkurung, where the local people have formed groups (20 in each village) and set up DPL - community MPAs. In these areas, traditional fishing is allowed, but DF fishers are chased off. "Jika ada yang mengebom, satu kampung ramai-ramai kejar" - if anyone tries to bomb, the village takes to the water en-masse to chase them off. These groups have been entered in National contest to find the best Kelompok "Siswasmas" (community surveillance group). They hope for national recognition and the right to implement enforcement.

- **New legislation:** The new law regarding fisheries-related offences, UU 31 Tahun 2004, which replaces UU 9 Tahun 1985, has very stiff sanctions for offenders, 6-10 years prison and/or fines of up to or even in excess of 1 "milliard" or 1,000 million Rp (1US$ = 7,000-9,000Rp). The breadth of offences has also been increased, so now it should be possible to process some at least of the "big fish" who manage the illegal activities without direct participation (e.g. financing/supplying material for bombs, dealing in DF catch etc)

- **Piracy:** pirates look for rich catches, e.g. traders en-route carrying cash, ships full of catch/cargo, rarely bother small fishermen. Beyond the capacity of DKP to deal with them. (off the record, Navy also incapable, as don't even have a vessel operational in the area, pirates much better armed and equipped than forces of law and order)

- **Cyanide:** before, a type of cyanide called "cap tengkorak" (skull brand) was used. Now often tobacco is mixed with the potassium cyanide pills used by gold smiths, called "potas". According to Pak Saud, this is not particularly harmful, and he has been told it can even be used to kill parasites on seaweed farms. He is unaware of it's use for fresh food fish or the health risks associated with this. He asked whether there would be residue in dried product (ikan asin). This is a good question, and needs an answer.

- **Bomb Fishing:** bombs are made using fertiliser, usually "Matahari" brand, a type not useful in farming as it is too strong for plants to absorb, and "burns" them. he was keen for any information on possible routes of supply. He suspects routes from Philippines and Malaysia (Tawau), also suspects some goes via Wanci (it definitely did in 1997, Abigail Moore personal observation).
- ***Penyuluhan:*** awareness building, socialisation, advice etc is done on regular basis in all 9 Districts, level and frequency depends on known or suspected level of infractions in the area, and on resources. He tries to visit the "***rawan***" (high risk) villages himself, and discuss the problems with the people there, including the village officials as well as the fishermen. Sometimes there are posters or other materials to distribute, most often laregely by direct communication (talking), formally (at a village meeting place) and informally (in homes or on the beach). Where possible, aims to spend up to 2 days per village, but sometimes only has 2 days per District. Locals are often reluctant to tell the truth, e.g. re bombs. However if many fish and no "proper" "***alat tangkap***" (fishing equipment), then it is obvious they are lying. So, rather than cause a confrontation he will try to work out what could be a reasonable alternative to bomb fishing at that location, and promote it. Maintaining good relations with the community is vital
- **Permits and Trading:** As far as Pak Saud is aware, all the OFT vessels are around 5 tonnes, he knows of 3 from Bali and 5 from Tumbak who have reported. They need "***ijin***" (permits) from the DKP for operating in the area, especially if undertaking any fishing themselves, and loading permits from Deperindag. Sometimes they pay, more often they don't, but no sanctions are imposed. Loading permits are now issued by the Trade & Industry Dept, Koperindag, and the income goes to Jakarta, however the responsibility for surveillance and enforcement of compliance is at the local level (Province & Regency), which Pak Saud feels is an unfair burden on limited local resources. The Koperindag should be 100% responsible for trade via MV Sinabung, even in fisheries products. Pak Saud was not aware of OFT via this route, only of dried fish (ikan asin) trade. For small-scale fishers -that is most fishermen and all OFT local fishers - no permit is required, but "***pendataan***" (record-keeping) is supposed to be kept by the DKP to a high level of detail, including numbers, boats, equipment, catches etc (see KI Pak Faisal).
- **Foreign ships:** some are legal, some illegal. Even ships with legal fishing or buying permits (mostly ships from Hongkong) often have illegal documents (e.g. loading papers say 1 tonne for every 10 tonnes of fish on board). Under-reporting means lower fees, as the retributions to the Deperindag are based on tonnage. Permits are from National level, obtained in Makassar, but agreed by Jakarta - cover all Sulawesi, Maluku, Kalimantan, and include the return to Hong Kong without further formalities.
- **Co-operation with other agencies:** The sharing of responsibilities between DKP and Deperindag has changed, before there was a larger role for DKP. Co-operation is variable, sometimes good, but far from perfect. Regarding protected species (e.g. napoleon wrasse, turtles etc), all permits should (and where issued do) go through the Deperindag, however there is supposed to be co-ordination with DKP. So far there never has been. As long as payment is made, permits are issued, even if they shouldn't be. Behind the scenes, co-operation often not so good with the Police - too much collusion and political/financial pressure from vested interests.
- **Enforcement:** For enforcement patrols, Pak Saud calls for back-up from the navy in Luwuk, who send people on the public ferry. The operations use the DKP speedboat or other craft available, and are highly secret. Pak Saud has made a map of the main DF and other infraction risk areas, and uses this to plan operations, but using codes that even if intercepted make it hard for outsiders to understand even if they overhear communications or get information. He has a background in military type operations planning. There are always several back-up plans for if it

seems than the main plan has been leaked somehow, with codes too. The operations aim to be as unpredictable as possible, and surprise the offenders. The next operations are scheduled for around the New Year and into January. When offenders or suspected offenders are intercepted, if they have communications equipment this is the first thing which is disabled/removed (foreign vessels, larger Indonesian vessels).

- **OFT knowledge:** Regarding villages visited, Pak Saud doesn't believe there were 30-60 OFT fishers in Tinakin in 2001, thinks the Tumbak fishers who then fished as well as buying must have been counted. Often then he says 20-30 Tumbak fishers would fish together with over 10 local fishers (confirmed later by KD Tinakin). Regarding Monsongan, he says now there is only one buyer, the others have shifted to other activities (confirmed later by Tumbak crew)

- **Recommendations:** Pak Saud had a number of points he was keen to put across.

(i) **Human resources:** Pak Saud feels that the most important requirement to improve surveillance and enforcement is more personnel - even though other people sometimes help out, it is hard to do the job alone. These should be field personnel, rather than office-based, though the latter would be better than nothing.

(ii) **Local Legislation:** PERDES - village ordinances/regulations, would greatly improve the effectiveness of local community-based as well as DKP surveillance and enforcement. When the KD (Village head) can undertake the enforcement directly rather than through Police and/or DKP based on (officially sanctioned) village rules, this is better/more effective, especially if the sanctions are well chosen. E.g. expulsion for repeat offenders.

(iii) **Operational capacity:** Communications and operational support would also be of great assistance

(iv) **Naval Back-up**: If there could be permanent Navy presence this would also help, as long as there was good co-ordination, as "operasi gabungan" (combined operations, usually DKP-Navy, rarely with community and/or Police as risk of leaks too high at present) are more effective than single department operations

(v) **Awareness building:** Awareness at all levels still needs to be increased, including at Government as well as community level (e.g. at the Koperindag to improve co-operation and BAPPEDA or Regency Planning Authority so they don't cut out fisheries budget requests)

3. **Pak Faisal:** he was late arriving, as had been invited by fishermen to go out on the maiden voyage of a new purse-seiner. When told about the project and who was involved, he said that copies of two of his books had been given previously to Pak Samliok (IPB reports), and that all the information was in these. He is an ex-student of Pak Samliok from the Alkhairaat University in Palu (Fisheries) and knows Pak Akhdary, as he was also an active LSM (NGO) activist while a student. Interview therefore started with a discussion about the nature of data - what it is, what is meaningful, and therefore what was really being asked of him. He was very surprised and at first wary, because generally (like the IPB/DKP team for evaluating the conservation potential of the Banggai Islands in 2003) people only want the official statistics - which can be bought cheaply from the public records offices, without bothering him! Once he realised that (i) we already had these two books , including the official statistics and the two above-mentioned reports, (ii) upon comparing them with what we knew of reality, and evaluating them with common sense (in some cases simple mathematics), we had realised they were full of errors at best, and in some respects basically a load of lies, and (iii) we would rather have "I don't know" where there was no information than a load of figures to satisfy some report format, he opened up and very frankly discussed the real data situation. The main points are given below.

- **Limitations in data colection/management:** Pak Faisal said that fisheries are "difficult" [for accurate data collection and management], in part because of the unpredictability of nature: weather, fishes move around... as they are living they are unpredictable. In order to gain support for data collection and management, Pak Faisal made a presentation to the DPR (local

Parliament), difficult to make them understand about the nature of fisheries even before the importance of data. Because of lack of human capacity, data collection and management has been of very little concern to DKP and other officials up to now. He is trying to change this, and his superiors seem to be beginning to see the usefulness and need for accurate and up-to-date data. Funds allocated to date have also been minimal, as has surveillance or checking. He feels the main barriers to better data are the lack of staff and the low level of technical knowledge and competency in this area.

- **Fisheries potential:** The DKP knows there is a large fisheries potential but has no real idea of the extent. As suspected, the figures given are a combination of extrapolation from capture data and guess work. No proper research has been done. Indeed, to show a potential investor the true capacity (in this case for small pelagics), Pak Faisal took him out on a fishing trip, because he knew if he relied on the figures which he knew to be false, the investor could easily loose confidence in him/the Regency administration and therefore choose not to invest. What Pak Faisal does know is that there are 6059 registered fishing families, with more part-time fishers. These families represent 22,497 people most of whom take some part in the fisheries activities. If only 1kg of fish per day is landed by each family, that is already a sizeable production (over 181 tonnes per month, 2181 tonnes per year), and the real production is much more than this. He uses simple standards like this to see if "data" he is given is at all realistic or not. Most isn't. Which is the conclusion we also had come to from similar thought trains.
- **Participatory Data Collection:** Pak Faisal had the initiative to involve the local communities in data collection, and organised the training of local people (including the Tinakin KD, who was keen but admitted to being unable to apply the training unaided), however with minimal funding - not enough to visit the villages after the training to follow-up. It seems the lack of interactive practice (which could have been cost-free) was due to lack of experience - he has no training in this type of teaching. An interesting discussion ensued. Pak Faisal hopes that by the end of 2005 data approaching the true figures will be available for some areas at least. He already has some data which he feels is close to accurate for a few villages for some of the indicators. The best is for Tinakin Laut. Some was printed off, but because of a computer malfunction (virus infection), the rest was not available.
- **Previous system:** Before this new "***pendataan partisipatif***" (participatory data collection) approach, forms were sent to the Camat in each District, but never came back - so forms to the next level (Province or National) were always based on guesses/extrapolation. Therefore, DKP personnel going to the field would be given data forms and asked to do their best to fill them in - if they could and had time - but with limited skills in this area and having to concentrate on other tasks, the data was often fragmentary, inaccurate or wasn't collected. If data for a given year was available, a percentage would be added based on a "guesstimate" of growth (usually 5-10%) or in times of recession, no change or a small reduction.
- **Exploitation by researchers:** Pak Faisal feels very strongly that people who come should give to the area as well as take, and not just "***jadikan obyek***" - which means basically exploiting the area - for example to get a chance for project money, free travel etc (which is how everyone I met felt about most research teams from Jakarta/Java). Primary Data from the case study was promised (in Indonesian translation) once the English report had been compiled and submitted, and some secondary data, including the Lunn & Moreau and Vagelli & Erdmann survey reports (available on the internet) were given in .pdf form, along with basic information on MAC provided by Gayatry Lilley for socialisation in the Banggai Islands.
- **Technology acceptance:** Pak Faisal feels that most local people are not ready for much innovation or information technology. This is a debatable viewpoint, as some innovations (katinting) are very easily adopted, and anywhere there is a signal, and any people have enough money, "hp" (hand phone = cell phone) sales soar, including in Banggai.

- **NGO:** Pak Faisal is on of the founders of an NGO (Yayasan Mitra Bahari), which has founded one of the two Fisheries High Schools in Banggai. Pak Faisal intends to make it a data centre for the area, so Government and other stakeholders will come there for real information/data, have a strong bargaining position with PEMDA and possibility to implement effective programmes, based on the realities of the people and resources. The Wallacea programme found more islands than previously recorded... over 123 islands, lots of potential. Pak Faisal said that land resources (farming/plantations) have already reached an upper limit, all good land is used or even overused. The population is increasing, and needs protein, so fisheries are necessary. The area has a high tourism potential. There is no plus value adding for almost all products at present. All this is a basis for a extensive marine programme.

A11.2 Luwuk Fish Quarantine Office - Kantor Stasiun Karantina Ikan Luwuk-Banggai

The Karantina in Luwuk covers 5 Kabupaten (Regencies): Luwuk Banggai, Banggai Kepulauan (Bangkepkep), Tojo Unauna (TUU), Poso and Morowali. It is headed by Pak Umar SPi, Kepala Kantor Stasiun, and was only formed in 2003. Before that Karantina service were handled from Makassar.

In 2003 there were only 3 staff, now there are 9 PNS (civil servants) 7 with a degree in fisheries and 2 administrative staff. Most are shown in Figure A11.2. In addition there are 4 "***honor***" or almost voluntary workers hoping to become PNS.

Figure A11.2 - Luwuk Karantina Sta

One person is based in Pagimana at the only branch office (***cabang***) opened so far, also in Luwuk-Banggai Regency. No ***cabang*** in Bangkep, TUU, Poso or Morowali. The duties of the Karantina are clearly set out in UU 16(2002) of which a photocopy was provided. A tour of the facilities was given and the staff discussed issues related to the OFT with great openness and interest. Names and Position of Staff interviewed are given in Table A11.1. Several are graduates of UNHAS University in Makassar, and had mutual acquaintances with the team, which made the interview process very relaxed and friendly. Some of the major points raised are given below.

- **Lack of "socialisation":** Most businesses or individuals don't know about the karantina - "sosialisasi masih kurang". The staff said that many people do want to follow the rules, if "sadar" and understand, then they will. Difficult to know how to meet "stakeholders" as dispersed - many small operators, not just a few easily targeted companies, and no effective umbrella body like a local Chamber of Commerce (including small businesses, self-employed etc) or sectoral organisation such as an association of people with fisheries related businesses. There is a good brochure (have copy) and the staff are willing to go to the field if their services are required or for sosialisation, but said they need to be paid, as they have a restricted operational budget
- **Lack of compliance:** those traders that do know, often only "see" the costs, don't see any benefit, so most try to avoid paying for the Karantina services. The Karantina themselves want to follow the rules, but don't want conflict. Using "softly-softly" approach. Only 2 or 3 companies so far from Bangkep have ever used the Karantina services, not for ornamental fish but for ***ikan asin***, dried salt fish.
- **Karantina role:** ALL fish or marine products leaving the area, whether in-country or for export should have a certificate from the Karantina. Certificates issued in Luwuk are good for all levels including for export, no further check required further up the chain, e.g. in Palu, Makassar,

Surabaya, Bali etc, just need to show this certificate to the Karantina there. There is a price list for services at back of rule book of which a photocopy was provided. Administration and taking/testing samples are the main jobs of the staff . The Karantina testing procedures cover:

- Fish health
- Species/type of fish
- Water quality (used in transport/holding)
- Do **not** include checking for cyanide (at least explicitly)

➢ **Testing:** Testing is done on a sample basis (1-5 specimens, more is better, depends on quantity of freight and species), either the staff go to the operator, or the fish are brought to the laboratory, which is quite well equipped (see photos). Live product is returned alive to the owner, so testing is non-destructive. Extra check can be made on demand (e.g. to comply with importing country regulations).

➢ **Infractions:** In the rules, there are 8 stages (rules ***Pasal*** 6) and if there are irregularities, the highest sanction is "***penolakan***" - refusal to grant a certificate. No prosecution or other sanctions available at this level.

➢ **Co-ordination with other organisations:** the Karantina staff said they would welcome an opportunity to work with other stakeholders to improve the system of marine product marketing, and liked the idea of certification, especially if the Karantina was to be involved. A copy of MAC promotional material was given to the staff.

Table 11.1 - Names and Positions of Luwuk Karantina Staff Interviewed

Name	Position
Pak Amsal	Staf Teknis Technical Staff
Pak Darmawan	
Pak Marlan	
Pak Moh. Zamrud (Liang)	
Pak Dedy Susanto	Staf Admin Administrative Staff
Pak Lamana	

Names in bold are staff who continued giving information in the laboratory after other staff had to leave for a meeting.

➢ **Knowledge of the OFT:** The staff think there are very few or no OF leaving Luwuk on the PELNI to the South , they think would all go on KM Sinabung if they use PELNI, because as far as they know Manado is the only destination other than Palu from the Luwuk and Bangkep areas. However they don't know very much, and don't know if KM Sinabung is used or how much. The only OFT business which has reported to them is based in Luwuk, with one vessel of around 5 tonnes, equipped with a compressor which brings the fish into Luwuk harbour. The operator takes out certificates to Surabaya. The route from Luwuk is overland to Palu, they don't know from Palu onward, but suspect by ship or air. The owner, Pak Nyoman, based in Mamboro near Palu does not have a registered company (CV or PT) as far as they know, he operates "***per orangan***" (as a sole trader), and therefore pays the minimum rates. (Note that according to APIHI in Palu this is incorrect, Pak Nyoman has a registered company, and should in theory pay accordingly). The person in Luwuk is a Pak Ali, who they say is rarely in port, mostly at sea. The main species are angel fish, "letter six" and BCF but not in great quantities as far as they are aware.

A11.3 KNPI

Pak Awi is the Head (***Ketua***) of the Bangkep branch of the KNPI (Komite Nasional Pemuda Indonesia) - the organisation for people under 40 (similar to Rotary), and is also a lawyer who used

to work part-time for the LBH - Lembaga Bantuan Hukum - a voluntary legal aid service for assisting poor people and charitable causes (such as some environmental cases). Pak Awi was on his way to a meeting of KNPI leaders in Palu, and was met by chance on the ferry to Luwuk, MV Mutiara. Pak Awi has a special personal and professional interest in maritime law and in marine conservation, which is the main reason why he was invited to the Stakeholder meeting. He is due to retire as head of KNPI soon, as he is now 40 and no-longer eligible for re-election. He said he is looking for another "good cause" to devote himself to. Points he made relevant to the OFT and related (marine) matters are given below.

- **OFT:** In addition to the areas the team surveyed, Pak Awi said there are many ornamental fish (good stocks) in Bangkurung. The OFT is less developed there, but fish are caught both by locals and people from other parts of Bangkep and from outside (Bali, N Sulawesi, Java). No people in OFT have yet become members of KNPI, which he regrets.
- **Other fisheries:** Most fresh and salted/dried fish is caught with bombs, the main headquarters of these operations is in Kalupapi. Toropot is a centre for chilled (iced) fish, the ice is brought from Kendari along with the bomb materials. There are 3 other centres including Kalupapi. Totikum is the main area where sea turtles (*Chelonia mydas* - green turtles) are consumed, by the Christian population there. The (largely Muslim) fishers in Bokan do most of the capture, then sell to Totikum. Eggs are also consumed. Because of religious reasons few Muslims in Bangkep consume turtle meat, though some eat the eggs. Nearly all (99%+?) Napoleon Wrasse and non-BCF OF are caught with "***bius***" (***bius*** means poison, in this case potassium cyanide), he knows of no other way to catch them in any quantity as they don't take the bait in hook and line fishing - or very, very rarely.
- **Legal aspects:** As a lawyer, Pak Awi feels that PERDA/PERDES are a good idea, but only if realistic and properly implemented. He feels the main problem with the law is not the regulations themselves but the fact that the law enforcers "***ikut bermain***" - are often involved (actively as partners/perpetrators or more often by collusion). Pak Awi feels there is a need for strong and impartial enforcement. In his professional judgement, current enforcement is poor, and the new law (although improved) still makes it hard to catch the "big fish" behind the bombers and cyanide users.
- **Perceptions of the law:** He feels that at present people feel that the risks are minimal and the rewards good. Pak Awi echoed Pak Saud's feelings that clearer laws would be a good thing, even if sometimes detection was not so easy, as a deterrent to many people, if not to hardened "criminal" element. He feels that a lot of "socialisation" of the laws is needed, including to people in the legal system such as judges as well as to fishermen, businessmen etc. If the legal people realised more the importance of environmental legislation, there would be more cases taken to court, with prosecution undertaken more seriously and stiffer sentences handed out. If people involved knew the penalties available within the current legislation, even without PERDA, and felt there was a real risk of incurring them it would make most think twice before committing infractions.

A11.4 Local Media

KI - Pak Guzaif

In addition to working at the Banggai PUSKESMAS, Pak Guzaif (Figure A11.3) has two other "jobs". One is as the instigator and co-ordinator of the local radio station, the other is as the co-ordinator of the local "Bulletin Pembangunan", a monthly printed bulletin giving information on current government and other projects/programmes in the area.

Figure A11.3 - Pak Guzaif , key person in Bangkep media - radio and press

Radio:

The station has an antenna and office on a hill about 3 mile outside Banggai which can cover all the Regency. The funds are basically from contracts, mostly from the PEMDA (Regent's office) and from the various Government agencies (Dinas, Badan etc) down to Kecamatan (District) level. The radio operates from morning to around 6pm, and is listened to by a majority of the population (confirmed by first field trip respondents).

Government announcements, news of programmes, information etc is spread by this means. Health advice is given, and there is also some entertainment.

The people working there receive payment from the government contracts, but do not get paid much, and do it because they enjoy it more than because of financial reward. There is strong team spirit, and effort to build the capacity of youngsters who get involved.

Bulletin:

The ***Bulletin Pembangunan*** is a monthly printed news sheet giving information on what projects and programmes are completed, underway, anticipated etc. How they are working. And other (non-political) relevant information. It is distributed to all levels of Regency, District and Village Government, and from there should reach as many people as possible.

The team have to get the news from the relevant departments and agencies and write it up. The Bulletin is printed at a computer hire centre, as the team does not yet have their own facility, and this is a major cost.

A11.5 - Pak Guhudeng, an OFC in Monsongan
Pak Guhudeng, OF Fisher, 17th December

Pak Guhudeng was one of the fishers involved wit his son in demonstrations (Figure A11.4) on the firs trip. A visit was made while waiting for the Villag Head (with whom a promise to meet in the afternoo had been made), but who was asleep. The mai original intent was to check on a few points c unclear data but also on the buyer visits since ou previous trip.

Figure A11.4 - Pak Guhudeng and his son Parman demonstrating BCF recapture techniques

The interview became more than this however, and revealed many interesting points not picked up earlier. Pak Guzaif from the clinic was involved, someone the family evidently knew and trusted, and this made the family open up on some points which they may have been ashamed to mention in the FGD previously.

Pak Guhudeng has a wife (Sinarti) and 9 children, 7 girls and 2 boys (the latest, still breast feeding and Parman). They now use the KB programme (pill) though the latest was conceived while Ibu Sinarti was taking the pill - possibly due to illness or mistiming/forgetting. The KB programme came to the village when they already had 5 or 6 children. It is not clear why they didn't participate until they had 8. It may be that they were hoping for another boy. He is from Bangkurung, she is local.

Figure A11.5 - Pak Guhudeng(Centre), Ibu Sinarti 'Front Right) and some of their children

The family is shown in Figure A11.5, in their "permanent" but almost unfurnished home. The eldest has just finished SMA - High School, the next two have left school, one is married to a building worker from Salaka and has one child. One daughter is still at the SMP and the elder boy is in SD. The others are still pre-school age (under 7). The parents would like all to finish SMA, however hard it is to pay for it, but won't force those who don't want to. Pak Guhudeng said that schooling is the most important, to "***jadi orang***" - to become people, meaning people with a choice in life, and capable of more than survival. When the parents are late paying school fees, there are reminders but the children are not expelled. However the children are made to feel ashamed, this is one reason the elder boy Parman (primary school) has come home in tears at times. At the time of the visit, his school fees had just been paid - including 2 months in arrears.

Ibu Sinarti is a "***padola***" - she buys and sells fish which her husband or other fishermen catch, but only locally, within the village - though she often climbs the hill to the farming areas. She usually makes a small profit, on an average day around 10,000Rp, on a bad day she may actually make a loss. Often she only has 5kg of ***lolosi*** (Caesionidae, a cheap schooling species, often targeted by bomb fishers) to sell.

The girls do not help much, they are ashamed to go to sea as traditional Bajo women did, adn some still do, even for the seaweed farming. They also do not help their mother in selling fish. They are afraid their friends will laugh at them, and that with their skins darkened by the sun it will be hard to find or retain a partner. At most they look after the younger children. Those at school are not expected to help anyway, as the parents want them to study seriously, but it was obvious that the parents were disappointed with the laziness of those not attending school. Although at school the young lad Parman does help sometimes, as we saw on the previous visit, especially with the OFC. The parents said the children are often "***marah***" (angry, upset, resentful) when there is no money, indeed they often cry. This is largely because of peer pressure making them ashamed.

The family rarely uses the health services (Manteri - paramedic), usually go to the traditional healer, say it is cheaper and often more effective, but if the healer can't cure what is wrong, and they have some income, they will go to the clinic. They haven't been given a "***kartu kesehatan***" - a free health-care card. If they had it, they would use the services more often. According to Pak Guzaif they should qualify, though some people would say they didn't qualify for the official "poor" standards, based on their having a "permanent" cement-floored house.

Clothes are often purchased less than once a year for each family member - not all get a new set each feast day, one of the criteria for poverty. Indeed it was obvious that their clothing was old, and the clothing store held very few items compared to the number of people (13-14) in the house. Officially there are two households - as the married daughter and husband with their child would be counted separately.

Pak Guhudeng has tried several activities. He collects OF regularly, and has a pond which he has built and wishes to improve. At the time of our visit he had several thousand BCF in this, along with a number of food fish and two hawksbill turtles. He is starting on seaweed production, for which he has high hopes. He confirmed the fate of the previous seaweed farming aid which all died after the earthquake. At last now people are brave enough to try again he said.

According to Pak Guhudeng, the ill-fated seaweed aid is the only aid received by fishers in the village in over 20 years that he has been there. He said that health and fisheries programmes usually didn't get to them, and that the cheap or free rice for poor people was only given to old people, not to those with many children, and that the sharing out is unfair, "***dipilih orang***" - only the chosen/favoured people get it. This was later checked with the KD (see Chapter 6), and then with the BKKBN.

Pak Guhudeng said that if they received aid at a level similar to other villages, the living conditions would be like theirs - i.e. he perceives Monsongan as being well below average on the well-being

scale compared to other fishing villages. Pak Guhudeng feels the problems are because those high up don't know, because no-one tells them the reality. He would welcome a chance to talk with people who could "do something". However although invited he did not attend the stakeholder meeting, unfortunately. He said the Bajo *were "**masyarakat yang dibuang***" - people who were cast aside. It would have been interesting for him to meet the Sekab, who is also a Bajo!

There are no organised fisher groups (***kelompok***) in the village, but Pak Guhudeng feels it would not be hard to form a group if that was necessary in order to take advantage of any opportunities. However he has no experience in this area, and clearly underestimates the challenges that would be faced in such an undertaking.

Pak Guhudeng had had a visit from the KM Sinabung buyer a few days before, who had asked him to prepare up to 1,000 BCF - which he did. However KM Sinabung left, and the buyer hadn't returned, so we watched as he sadly re-released the BCF into his pond (Figure A11.6). He says the BCF are now breeding there, and he never takes the brooding males. He occasionally throws some chopped trash fish in the pond, which he says they eat - as do the other fish - but mainly they look after themselves.

Figure A11.6 - Pak Guhudeng about to release the BCF he captured in vain

Pak Guhudeng has placed an old broken sampan in the pond to provide a shelter for the fish during the heat of the day, and says they nearly all take refuge there most days.

One of the younger daughters said the two hawksbill turtles in the pond were pets, but they weren't there on our last visit and according to Pak Awi (on return journey) and other local people, hawksbill turtle shells are sold in quite high quantities - the shells being cut from the turtles which are then thrown back alive. Maybe later we will find out the fate of these two. In view of the family situation, if a buyer came it is likely they would be sold.

Pak Guhudeng has a gillnet, though not a suitable boat to take it out. When he gets a chance to use it, i.e. with someone else's boat, at the right moon phase, he can make IDR 20,000 to IDR 50,000 per trip. This is how he has the capital for starting the seaweed again. However he feels the chances don't come often enough.

The "permanent" house the family live in is made of bare concrete bricks, and was constructed by the son-in-law. Some of the materials it seems were taken from the building sites and some were bought by Pak Guhudeng from the proceeds of trading octopus, an activity which he no longer does, it is not clear why. This is the only contribution the son-in-law has ever made to the household, as he smokes (IDR 14,000 per day) and drinks (much more still) all his wages (around IDR 30,000 per day). His wife and child still depend on Pak Guhudeng for food, clothes etc, and whenever not working away, he also eats with the household, with no contribution. The father said to his other daughters, be more careful in choosing a husband, the main thing is make sure he works and doesn't drink, don't think about good looks!

The family eats rice sometimes, but often can only afford ***ubi*** (cassava), ***sagu*** (sago) or corn (dried maize), which are perceived as inferior. They cannot always afford sugar in their tea and cannot afford milk for the children except when there is a "***pembeli***" - an OF buyer. The baby is breast-fed, this is supplemented with ***bubur*** - rice gruel, and ***supermi*** - instant noodles, which are also given to the other young children. Meat is only eaten when invited to a "***pesta***" - a ceremonial occasion (marriage, death, circumcision etc).

The proceeds of OF are mainly used for education and to improve the diet (such as milk above), sometimes also for other items if enough.

The household cooks with wood from the nearb remnant mangrove stands, or sometimes from the lar which they farm. Lighting is usually by electricity 10W bulb), backed up by a parafin lamp when there a power-cuts. Parafin, as all petroleum products, is ha to come by, and electricity is cheap - usually IDR 7,000 per month, sometimes IDR 15,000. The kitche (Figure A11.7) is outside the house at the back, walled bamboo and wood platform over the waterwa between houses, and doubles as a bathing ar sanitation facility.

Figure A11.7 - The Kitchen cum bathroom/WC of Pak Guhudengan and Ibu Sinarti's House

Although they have a small clove plantation, this is too small to cover much of the family needs, and as they are registered as a fishing family they are not eligible for any of the aid given to farmers.

Pak Guhudeng once had a katinting-powered boat, but it got old and beyond repair, now he only has a small dugout which he paddles for the seaweed and OFC activities.

In 2000, the provision of ropes and seed for the seaweed farming was accompanied by some training, and everything started well until the earthquake. Although several people are now trying again, no-one was invited to the recent training.

The family's "dream" is a freezer, to make ice for both fishery uses and for making cheap ices to sell (with bottled syrups, palm sugar etc). This would give the girls an attractive (to them) way of making a living and contributing to the household.

A11.6 - Pak Mudir - Tinakin Laut Village Head

In addition to OFC data included in the main report, Pak Mudir (Figure A11.8) had been trained by DKP for data collection, during the previous month. He showed copies of the forms, which are really complicated. The same information has to be filled in several times on different sheets in different formats and combinations.

The data to be collected includes: number and names of fishermen, boat numbers and types (per fishing household and for the village), numbers and types of fishing gear types (per fishing household and for the village), and average catch data (in kg, with limited category data) per fishing household per month and for the village. The training session included around 30 people from all over the Regency, one from each of the target villages, some were also KD, others fishermen.

Figure A11.8 - Pak Mudir (Left) with study team members in his house in Tinakin Laut

Two villages from Banggai District were represented. Some participants were invited from each District (Kecamatan). The other village in Banggai was not one previously visited by the team (Monsongan, Tolokibit or Bone Baru), but Pak Mudir couldn't remember which village it was.

There is a fee of IDR 180,000/month for doing the data collection, but it is so complex that Pak Mudir hasn't started yet. He feels there needs to be a field follow-up, as in the training they did no

exercises, only listened to lectures and watched examples by the DKP trainers, over 3 days. When showing the forms he was visibly puzzled by some, and also felt it to be very difficult to do in practice, and extremely time-consuming. The information required could easily be input onto 1 or 2 simpler forms then filled into Excel or Access by DKP people for reformatting to the DKP standards.

A11.7 - Crew of Tumbak vessel KM Nurul Bahari

Tumbak Crew:

The crew (Figure A11.9) were very friendly, especially once they realised the interviewer, Abigail Moore, had been to Tumbak in 1999. The interview started by discussing changes there. It seems that most of the items which had been listed as priorities on the planning in 1999 had still not been fixed... The fresh water pipe (then broken since 10 years before) has not yet been prepared and people still paddle a long way for water; education is still only to Primary level, as it is 2,000Rp each way to the nearest SMP with unreliable transport, and the road has still not been repaired. Indeed it is apparently worse than before! That means much worse than the road to Bone Baru...

Figure A11.9 - With Tumbak Crew on KM Nurul Bahari in Bone Baru Bay

The programme was explained and the crew thought it was a good idea, and agreed to assist, so specific information OFT obtained. However lack of writing instruments and limited time meant that not as much (especially numerical) information was obtained as might have been desired. The main points were:

Level of OFT in Tumbak: There were indeed 10 OFT boats operating from Tumbak in 2001/2002, but since 2002 the trade has diminished, and now KM Nurul Bahari is the only boat still operating regularly. Pak Undu is the buyer who uses MV Sinabung, and used to operate one of the other boats.

Shift in Occupation: The other boats are now dealing in salt dried fish (***ikan asin***) which is currently in vogue. This is worrying as almost all ***ikan asin*** is said to be caught with bomb fishing (by the DKP staff), which was confirmed by the crew. Proyek Pesisir was supposed to eradicate Desrtuctive Fishing (DF) in the target villages including Tumbak. It would seem that as in 1999 (Moore 1999), the main thing is not to do DF or encourage it near to home...

Oxygen used in packing: The oxygen tanks onboard are still the original two donated by IMA in the 1990s and seen on the visit to Tumbak in 1999. They had been corroded then, and are now in what appears to be a potentially dangerous condition (photos). The oxygen valve (tap) is also original (see photos and film) and seems in good condition. It is removed (with adjustable spanner) between uses. These two tanks are sufficient for one trip to Bangkep until arrival in Tumbak where fish are released into keramba.

Packing and Care in Transport:

A demonstration of packing was done, though without fish. Photos and video were taken. The bags of fish are placed loose in the hold, piled several high, not boxed as for MV Sinabung transport. All OFC material and stocks are in the front hold (see photos), the rear area is for the engine and crew. The special double plastic bags are washed and re-used several times, at least 3 times, often more. Napoleon wrasse are difficult in bags, need changing water/oxygen every 6 hours or less, whereas BCF only need oxygen every 10 hours. The crew only bother with the more finicky fish because the

buyers are reluctant to take BCF unless there are other species too. For all fish, oxygen is replaced at least 3 times per journey, depending on journey time (weather).

Holding in Tumbak: on arrival, fish are kept usually for a few days before a buyer comes from Manado. If kept for some time, BCF are fed on chopped fish, usually after about 2 weeks as then they "***jadi kurus***" - become thin. Letter six are fed on chopped chinese cabbage, which they say they really like. When fish are rejected by the Manado buyers in Tumbak, they are released there. As a result there is now a BCF colony there, which has grown and is exploited by some of the Tumbak people now.

Use of "obat in packing: The "obat" used for the fish packing was shown. It is a patent fish medicine sold in small sachets at 15,000Rp per sachet, and is an antibacterial/antifungal agent (Figure A11.10) for preventing/curing fish infections and promoting wound healing. As an antibiotic it would also have soporific effects, which would explain the relative "slow motion" observed by the team in BCF packed using this medium.

Figure A11.10 - "obat" used in packing

Relations with Bangkep Authority: The crew say that on each visit they have to pay 30,000Rp to the Perikanan (Fisheries) [however, staf from DKP said that they actually pay to the Deperindag. Obviously some inter-department grey areas here, as Deperindag does not admit this...]

Pricing and Species Information: The price of BCF from the Manado buyers is 1,200, and the price for Letter six is 15,000. However, BCF are more profitable than Letter six, because only around 10% die, whereas often more than 60% Letter six die. Other species traded include clown fish, several species of angel fish but especially piyama, napoleon wrasse ***Cheilinus undulatus*** and barramundi cod ***Cromileptes altivelis***.

Income from the OFT: The crew of 5 each receive the same payment, which is based on profits. Usually it is between 200,000Rp and 400,000Rp per trip, and there are 1 to 3 trips per month. If three good trips are made, they feel they are well-off, but if only one poor trip is made, as they said, how can they feed their families let alone pay the school fees. It seems they too are most often still in debt, as in 1999.

Social Organisation: The whole operation is controlled by a "big boss" in Tumbak, all the crew depend on him. This was the case in 1999, so little change. The Tumbak crew said they enjoy their work, they say being rich is no use if you have to do unpleasant work to earn it. They say that is one reason why they stay in the OFT after others have left.

Links to Manado & Bali: It would also seem they (or their boss) have a special relationship with Bali, as one of the crew (young but obviously respected by the others) has "***keluarga***" (one or more family members) in the OFT in Bali, and that the trade goes through them. The Manado buyers are go-betweens between the Tumbak fishers and this Bali operation. They didn't know (or wouldn't say) the name of the Manado or Balinese firms or individuals involved, or of their "Big Boss", so the point was not pressed.

Ordering: The crew are given a list before they set out as to what fish are required. Usually they can fulfil the orders, but not always, especially if mortality is high. They will only go as far as they have to their order. If all ready in Bone Baru they do not go to other villages

Trade Route and Local partners: the villages the Nurul Bahari crew visit regularly apart from Bone Baru, their main base of operations, are Toropot (most frequent), Monsongan, and sometimes

Tolokibit and/or Kalupapi. They are not as keen on Monsongan BCF, because they "***agak hitam***" - are darker/blacker - than those from other locations, and this colour is less desirable to the buyers. Toropot is the main "letter six" source. This species can only be caught with compressors, and other villages do not have compressors used for OFC according to them. They used to do the catching themselves, but now they only buy from local fishers. They feel this benefits all parties, as they have faster turn round and local people can make a living too.

Selection Criteria: the Nurul Bahari crew won't take fish with eggs, fish with any kind of damage especially to the fins which are a main attraction of the species, fish below ring finger fingernail body size (just over 1cm²), or very large fish. Thin looking fish are also rejected or any which look unfit.

General attitude: the crew are very keen for the trade to be sustainable, and would support any measures to ensure this, as long as it didn't stop them making a living. They understand that the area need to make an income, so don't mind paying the 30,000Rp which they feel is affordable, and want to comply with regulations so they will be able to get on with their business without risk of conflict with authority. The crew were are quite obviously unaware of the suspicions of the locals regarding the counting/sorting procedures. They also do not interfere in how the locals divide the quota, they just want the right number of the right quality fish.

Frequency of buying visits: The frequency of buying trips to Banggai Kepulauan depends on the weather. In the ***Musim Utara***, North Wind season, it is easy to come but hard to go home! However this corresponds with the best season for export sales (winter in the Northern Hemisphere), so they try to make as many trips as possible then. There is a headland they have to pass where the waves come from all directions and there is often a whirlpool, this is the main barrier and sometimes they cannot pass.

Appendix 13 - Stakeholder Meeting Inputs

A13.1. Meeting in Palu, December 2004

This meeting was held on 30th December in the meeting room of the Dinas Kelautan dan Perikanan Sulawesi Tengah, in Palu (Provincial Department of Marine and Fisheries), and was facilitated by the Dinas in terms of issuing invitations and providing both the venue and refreshments. In addition to Marine and Fisheries Department Staff from all sub-departments, invitations were issued to relevant stakeholders (individuals or organisations) who are listed in Table A13.1.

A powerpoint presentation was given, and a printed handout explaining the background of the programme and giving a resume of the findings was distributed. The presentation is given in Appendix 14.

Over 30 people attended the meeting (Figure A13.1), which lasted from 9a.m. to 1p.m. and was followed by a meeting of the presenters (Samliok Ndobe and Abigail Moore) with the Provincial Fisheries and Marine Department Head, Pak Faisal, where the case study team were requested to submit a proposal for implementing some of the case study recommendations in 2005, which has been prepared.

The Presentation *Participants: APIHI Representatives* *Environment Dept & Fisheries Dept*

Figure A13.1 - Provincial Stakeholder Meeting in Palu

Points discussed at the meeting included:

Rules and Regulations: several people stated that existing national laws (UU) do cover most aspects but are not sufficiently well known/understood by many people and are often not applied or not used effectively. Several people expressed support for local legislation (PERDA/PERDES), especially specific regulations for both fishery aspects e.g. fishing gear, methods and harvest levels/patterns and for market aspects e.g. regulating prices and other aspects of the market chain. Examples of infractions were cited, e.g. Kendari example.

Permits, Fees and Reporting Procedures: All agreed that this aspect requires serious attention, especially as the current situation is such a "mess". Some people saw this as merely a question of implementation of procedures, others felt the existing system is not clear and/or hard to apply in real life conditions.

International Market Chain/System: several questions arose regarding clarification of the existing market chain and marketing system and about certification (what it is, and what are it's benefits). The threat of export market closure or reduction from international or unilateral legislation by importing countries was perceived as a real threat, and the idea of pro-actively seeking to "put our own house in order", e.g. through certification, was well supported.

Local Trading Levels: it was felt that the fishermen should be assisted in organising themselves to compete more effectively in the market, e.g. through co-operatives or other groups (***kelompok***). Better co-operation between players should be encouraged.

Technical Aspects: several questions related to fishing gear, biological aspects of the target species and other technical aspects. Especially, what is the best gear, what are the best fishing and handling techniques and when is it best to collect - or when should collection be banned. How to impart "best practice" was also felt to be an important issue, though there was not time for a proper discussion on this point. More information was requested (and given) regarding the target species. The effects of using cyanide and other chemicals was discussed, including requests for information on the effects and conflicting views on the use of this substance. It was mentioned that apparently some researchers have found cyanide beneficial in low concentrations for seaweed farming, whereas others believed cyanide kills farmed seaweed. In view of the overlap in spatial use between ornamental fishing and seaweed farming this is an important point. Possible alternative substances were mentioned.

Sustainability and Conservation: further information was requested as to requirements for achieving sustainability and what practical conservation measures were recommended. It was clear that all felt this was important and that action should be taken as soon as possible.

A13.1 Organisations Invited to the Provincial Stakeholder Meeting

Participant Organisation	Translation/Explanation
BAPEDALDA - Badan Pengendalian Dampak Lingkungan Daerah	Provincial Department of the Environment
APIHI - Asosiasi Pengusaha Ikan Hias Indonesia	Association of Indonesian Ornamental Fish Traders
BAPPEDA - Badan Perencanaan Pembangunan Daerah	Provincial Development and Spatial Planning Department
Conservation International Indonesia (CII)	Palu Branch of the international NGO
Pengusaha Ikan Hias Air Laut (Panorama Laut)	A marine aquarium trading company in Palu
Universitas Alkhairaat Fakultas Perikanan	Fisheries Faculty of Alkhairaat University
Program Studi Budidaya Perairan Universitas Tadulako (UNTAD)	Tadulako University Aquaculture Study Programme
DPK - Dinas Perikanan dan Kelautan Propinsi Sulawesi Tengah	Central Sulawesi Fisheries and Marine Department (all departments)
BKPMD - Badan Kordinasi Penanaman Modal Daerah	Provincial Investment Co-ordination Body (a Government Department)
BKSDA - Balai Conservation Sumberdaya Alam Propinsi Sulawesi Tengah	Provincial Department of Nature Conservation

Persons attending and participating actively in the discussion included:

From the DPK:

Khaerani Nasution - Kasubdin (Sub-Department Head)

Ade Riswanto - Laboratorium Pembinaan Mutu Hasil Perikanan (Laboratory for improving the quality of fisheries produce)

Muhlis Lamboka - Kasubdin Kekayaan Laut (Head of Marine resources Sub-department)

Staff: Agung Kastono; Johannes Riga; Yunber Bamba; Ketut Elias; Zulkifli Tampubolon

Other:

BKPMD

Pak Roni - APIHI Representative

The Owner of Panorama Laut

Sandra Tobondo - BAPPEDA

BAPEDALDA staff

(CI & BKSDA didn't come)

A13.2. Meeting in Banggai, January 2005

This meeting (Figure A13.2) was held in the Bupati's Office meeting room, which is open air though sheltered from the elements, with a magnificent view over Banggai Bay, and, appropriately, Tinakin Laut, one of the survey sites. The meeting was originally planned for 18th December but took place on 8th January. The Bupati's Office and Regency Marine and Fisheries Department facilitated the event through issuing the invitations (from a list provided by YPH, Table A13.2) and providing refreshments. The meeting ran from 9 a.m. to 1 p.m. and after the presentation was given (essentially the same as in Palu, Appendix 14) and the handouts (slightly modified) distributed there was a lively discussion session chaired by the Sekretaris Kabupaten (Sekab) Drs Zakariah Kamindang and Drs Kornelis Yabie, Head of the Marine and Fisheries Programme Sub-Department.

Unfortunately not all invited were able to attend, for example several top Government officials had just left for the Hadj pilgrimage, but most key stakeholders were represented and the meeting revealed a surprising degree of unanimity between them on many points.

Drs Kamindang opened the meeting with an address focusing on the uniqueness of the Banggai Cardinalfish, endemic to the area. He recalled his experiences playing with this species as a child, and said that Banggai people must not let it become only a memory. He felt Banggai people bear a responsibility to future generations and indeed to the World for this unique heritage. He went on to say that Banggai is an Island Regency, and all marine resources must be used wisely for the long-term benefit of the people. Therefore we were all gathered in a spirit of brotherhood and openness, to look for a better way forward together, not to look for past faults, even where illegalities had been committed.

The meeting focused mainly on the Banggai Cardinalfish, as being the ornamental fish species of greatest concern to most people present, though trade in other species was mentioned. In particular all agreed that the current situation in respect of the ornamental fish trade, especially that related to the Banggai Cardinalfish, is far from ideal and that positive and concerted action is needed. The meeting ended with a request to the survey team to submit a proposal for practical action in 2005 which is now being prepared.

The Regency Offices

View over Tinakin Laut from venue

During the Presentation

Chairs Drs Kornelis&Drs Kamindag

During the Discussion with Stakeholders

Figure A13.2 Banggai Kepulauan Regency Stakeholder Meeting in Banggai

Points discussed at the meeting included:

Biological and ecological aspects: several participants asked about detailed biological and ecological aspects of the ***Pterapogon kauderni*** (BCF) life cycle, especially with reference to implications for fisheries regulations (initially raised by the DPR representative, a potential legislator), for example whether closed seasons would be appropriate as a management tool. Information on breeding cycle and other aspects was given, similar to Appendix 6. The Panapat Village Head had some interesting information on this subject, regarding the sustainability of rotational collecting, allowing areas to recover before fishing again. He recommends at least 3 months.

Conservation: All agreed that conservation (including sustainable use) of BCF is a priority, and needs attention. As no-one had the technical knowledge to discuss the methods, YPH was asked to submit more detailed proposals for this as soon as possible. The possible effect of sea-urchin consumption on BCF populations was raised as a concern. Should the conservation of sea urchins (*Diadema sp.*) be considered, as in some villages these (as well as the more commonly collected *Tripneustes* species) are eaten by locals, resulting in depleted populations? According to the Panapat village head, this is not a problem because when there are fewer sea urchins the BCF move into the branching corals more. Others said the species eaten are not those favoured by BCF, however in Monsongan (where *Diadema* populations are seemingly very healthy) the remains of recently consumed *Diadema* urchins were seen and photographed during the survey so this is not entirely true. The idea of LMMA type MPAs was also discussed, as from the presentation several people were attracted by the idea but didn't fully understand. Once more information was given, this concept was seen as a good idea in principle, though it was felt assistance would be needed in setting up any such system.

Capture methods, Holding/Handling and Equipment: some clarification was requested on various methods, which the fishermen present helped to answer. Effects of various actions on the environment were explained in more detail, and once again the Panapat Village Head assisted with imparting information on equipment which causes less damage to the fish themselves. The need for better information on methods and possibly for training was raised by a number of people, and the team were asked if there was a manual in simple everyday language for the BCF and other ornamental fisheries which could be distributed locally. Unfortunately as far as the study team is aware there is not yet a such a manual, though there are technical manuals by MAC for certification standards. The team said they would check with experts and let people know if there was such a manual. If not, then all agreed that preparation of such a guide, which could also be the basis for local regulations, would be a great advantage.

Rules and regulations: there seemed to be some uncertainty on this point as to exactly who should regulate what or should implement the regulations that are in place. The main very clear point made was that existing regulations are poorly understood, little implemented and hardly ever complied with. All agreed that the situation needs clarifying and putting in order. Most felt that although National regulations do in fact cover most aspects, they are complicated and often cumbersome or otherwise hard to apply, and that simple, clear, more easily implemented local regulations (PERDA at Regency level and PERDES at village level) are badly needed, and could help greatly with improving many problems. All the Government departments felt that the nil contribution to the Regency income from the OFT needed addressing, but in such a way as to benefit all, not merely impose unacceptable overheads promoting even more illegality. The problem of the "thieving" fishers form outside of Bangkep was seen as a major threat by everyone, fishers, officials and others. PERDA and PERDES were seen as one partial solution, especially through empowering locals to take part in surveillance and enforcement. There was an admission on the part of both the executive and legislative officials that there is a lack of expertise for drawing up such regulations,

and that assistance in this field would be required. One participant was a lawyer (the Head of the KNPI), but would need technical backup from fisheries and other experts.

Social Aspects & Organisation of Fishermen: it was recognised that lack of organisation of fishermen makes their bargaining position very weak. In particular, the participants admitted that if one village or one group tries to set a higher price for fish, there are always other villages, groups or individuals who will undercut this in order to make a quick sale. Lack of access to formal credit was also an issue. Sadly the BPD although invited was unable to attend and answer this point as had been hoped. One valuable suggestion made was that fishermen, in this case those involved in the OFT, should be organised not just in groups within a village designed for projects as at present, but across the archipelago, with village, district and Regency level representatives, with agreed common standards and policies, including technical aspects and pricing. As this was made at the end there was not much time to discuss it, but the idea seemed well received, and the study team fells it has great merit.

Trading: the low price was discussed, and the feeling was that there were two main causes, the "mafia" aspect of the higher level trade, and the lack of unity of local fishers. People are not satisfied with current prices, and the ex-financier present said he retired from the trade because the prices made it almost impossible to make a profit. However he would start again if the market picked up. Lack of predictability and poor communication regarding how many fish were required and when, including being let down (fish ordered and not collected), was seen as almost as much of a problem as price. Assistance was requested in building more reliable trading links.

Threats from Conservation: the threat to the trade in BCF from breeding abroad and above all the possible listing of the species as endangered, was taken very seriously, and several participants requested more information. Several stressed that local conservation action must be taken pro-actively and the widely publicised in order to prevent moves to stop the trade from the Bangkep area, and requested the team's assistance in so doing. Both setting up conservation measures and publicising them internationally. It was pointed out that by following the steps towards achieving (MAC) certification, both these goals could be achieved.

Role of Government (Legislative and Executive): Some stakeholders present felt the government does not do as much as it should either in terms of conservation or of assisting poor fishers. This was acknowledged by officials, especially the DKP, but blamed on lack of resources more than lack of will. Resources are indeed very limited, and the discussion resulted in an appeal for greater co-operation and synergy between all parties, government (including internally between departments), NGOs, private sector and local communities. Although not explicitly stated, it was clear that one concern is the continuing perception of there being too much ***KKN*** still, including (especially) in enforcement areas.

Role of NGOs: several people present represented NGOs as well as the organisations in whose name they were invited, and YPH is of course itself an NGO. One of these was very vocal in criticism, which was well received and some of which raised important points. Several people (including community members as well as officials) said that NGOs were very good at criticising but often less keen on providing solutions, and unfortunately even less active in implementing solutions. However it was also recognised that NGOs often have access to wide areas of expertise and sources of support which Government does not, and are potentially valuable partners in seeking and implementing solutions. YPH (and other NGOs) were invited to submit proposals for practical action in connection with the OFT, to improve sustainability, local livelihoods and income to the community generally.

What can we do now? YPH was asked to prepare a more detailed version of some of the recommendations made at the meeting which could realistically be implemented in 2005, and present it to the Regency Government as soon as possible.

Table A13.2 List of Invitations to Banggai Stakeholder Meeting

NO.	Name[6]	Details
		Regency leaders:
1.	Bupati BANGKEP	Regent
2.	Sekab Bangkep	Regency Secratary
		Legislative Government:
3.	Ketua Dekab Bangkep	Head of local parliament
4.	1 orang Anggota Dekab Bangkep	Member of local parliament
5.	1 orang Anggota Dekab Bangkep	Member of local parliament
		Executive Government:
		- Department heads:
6.	Kadis Perikanan dan Kelautan Kab. Bangkep	Marine and Fisheries
7.	Kepala Dinas Koperindag Bangkep	Trade & Industry
8.	Kadis Kesehatan Bangkep	Health
9.	Kepala Badan Catatan Sipil dan KB Bangkep	Family Planning & Civil Registry
10.	Kepala Kantor. Stasiun Karantina Luwuk Banggai	Fish Quarantine (in Luwuk)
11.	Kabag Ekonomi Kab. Bangkep	Economy
		- Staff:
12.	Staf Dinas Perikanan dan Kelautan Bangkep	Fisheries department
13.	Staf Dinas Perikanan dan Kelautan Bangkep	Fisheries department
		Village Leaders (Heads/Secretary)
14.	Kades Monsongan	Monsongan
15.	Kades Bone Baru	Bone Baru
16.	Kades Tinakin Laut	Tinakin Laut
17.	Kades Panapat	Panapat
18.	Kades Toropot	Toropot
19.	Kades Liang	Liang
20.	Sekdes Tolokibit	Tolokibit
		Fishers[7] and OFT participants:
21.	Pak Guhuddeng - Nelayan Desa Monsongan	OFC Monsongan
22.	Pak Abdul Rahman - Desa Bone Baru	OFC Bone Baru (co-ordinator)
23.	Pak Ali Yasin - Desa Bone Baru	OFC Bone Baru (co-ordinator)
24.	Pak Dayu/Pak Supriadi - Desa Toropot	OFC Toropot (co-ordinator)
25.	Hj Umrah - Desa Monsongan	Ex- financier Monsongan
		Resource Institutions:
26.	Pimpinan Bank BPD Bangkep	BPD Bank Head
27.	Ketua KNPI Bangkep	KNPI Head
28.	Kepala SMK Liang	Marine High School Headmaster
29.	Kepala SUPM Mitra Bahari Banggai	Fisheries High School Headmaster
30.	Kepala SUPM Karya Sama Membangun Banggai	Fisheries High School Headmaster
		Other:
31.	Pimpinan Perusahaan Mutiara Monsongan	Pearl Farm owner (as courtesy)
32.	Ibu Aniza Suspita	STREAM[8]
		Case Study team:
33.	Ir. Samliok Ndobe, M.Si.	YPH
34.	Abigail Mary Moore, M.Sc.	YPH
35.	Drs. Akhdary Dj. Supu	YPH[9]

[6] As faxed to the Kantor Bupati by YPH for issuing of invitations

[7] Panapat Village Head and Tolokibit Sekdes are also OFC and co-ordinators

[8] Unable to attend because all DKP staff required for Tsunami briefings in Jakarta

[9] Unable to attend through sickness

Appendices Bali/Java Case Study

Appendix 19 - Prices of Ornamental Fish in Bali & Java

Angel Fish

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
1	les001	*Apolemichthys trimaculatus*	Three-spot angle fish	3	12	Angel Asli
2	les002	*Pygoplytes diacanthus*	Regal angelfish	12.00	12	Angel Doreng
3	les003	*Pomancanthus navarchus*	Blue faced angelfish (M,L)	15.00,28.00	6,4	AngelPiama
4	les004	*Pomancanthus emperator*	Emperor angelfish	2.00	6	Bs. Asli
5	les005	*Pomacanthus xanthometopon*	Blue face anglefish	28.00	4	Bs. Napoleon
6	les006	*Pomacanthus sextriatus*	Blue faced angelfish	4.00	6	Angel Napoleon
7	les007	*Pomacanthus sextriatus*	Six banded angelfish	5.00	4	Bs. Koran
8	les008	*Pomacanthus semicirrulatus*	half circled angelfish (S,M,L)	4,00	12	Bs. Kambing
9	les009	*Pomacanthus semicirculatus*	half circled angelfish (S,M,L)	5.00,7.00,10.00	6,4,4	Bs. Biasa
10	les010	*Pomacanthus narvacus*	Majestic anglefish (M,L)	15.00,28.00	6,4	Bs. Piama
11	les011	*Pomacanthus imperator*	Emperor angelfish (M,L)	25.00,2.50	4,12	Angel Batman
12	les012	*Pomacanthus anularis*	Bluering angelfish (M,L)	22.00,11.00	4,6	Angel Anularis
13	les013	*Genicanthus melanospilos*	Black-spot angel fish	4.00	16	Angel Swalow
14	les014	*Genicanthus Lamarck*	Lamark's angel fish	4.00	16	Angel Zebra
15	les015	*Genicanthus Lamarck*	Lamark angel fish	4.00	16	Angel Zebra ekor panjang
16	les016	*Cheatodontoplus Sp.1*	Grey-Tail angelfish	4.00	16	Angel Marmut ekor putih
17	les017	*Chaetodontoplus melanosoma*	Black velvet angelfish	15.00	12	Angel Melati
18	les018	*Chaertodontoplus mesoleucus*	Vermiculate angelfish	4.00	16	AngelMarmut ekor kuning
19	les019	*Centropyge vrolickii*	Pearl scalled angelfish	1.00	16	Angel Abupolos
20	les020	*Centropyge tibicen*	Keyhole angelfish	2.00	16	Angel Biru
21	les021	*Centropyge multifasciatus*	Banded pygmy angel fish	12.00	12	Angel Doreng model
22	les022	*Centropyge flavipectoralis*	Moonbeam dwarf angel fish	3.00	16	Angel kenedi
23	les023	*Centropyge eibli*	Eibl's angelfish	3.00	16	Angel Abuliris
24	les024	*Centropyge bicolor*	Blue-gold angel fish	2.00	16	Angel Bk
25	les025	*Centropyge flavicauda*	Damsel angelfish	4.00	12	Angel Ungu
26	les026	*Centropege Nox*	Midnight angelfish	4.00	16	Angel polos
27	les027	*Centropege bispinosus*	Coral beauty angelfish	3.00	16	Angel Model

Butterfly Fish

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
28	les028	*Chaertodon kleini*	Brown butterflyfish	4,00	6	Kepe Coklat
29	les029	*Chaetodon lunula*	Raccon butterflyfish (S,M)	2.00,2.50	16,6	Kepe Gajah
30	les030	*Chaetodon auriga*	Thread butterflyfish (S,M)	5.00,6.00	12,6	Kepe Auriga
31	les031	*Chaetodon burgessi*	Citron butterflyfish	4,00	6	Kepe Susu
32	les032	*Chaetodon burgessi*	Black barred butterflyfish	3.00	12	Kepe Burgesi
33	les033	*Chaetodon decussatus*	Blackened butterflyfish			kepe punggung mata hitam
34	les034	*Chaetodon ephippium*	Saddled butterflyfish	2.00	12	Kepe Monalisa
35	les035	*Chaetodon lineotus*	Lined butterflyfish	4.00	6	Kepe Angsa
36	les036	*Chaetodon lunulatus*	Pacific pinstriped butterfly (S,M)	1.00,2.00	16,6	Kepe Doreng
37	les037	*Chaetodon mayeri*	Mayer's butterfly fish			Kepe Mayeri hitam
38	les038	*Chaetodon melanopus*	Two eyed coralfish (S,M)	4.00,5.00	12,6	Kepe monyong B
39	les039	*Chaetodon mertensii*	Mertens butterflyfish	4,00	16	Kepe Tikar
40	les040	*Chaetodon Ornatus*	Ornate butterflyfish	4.00,6.00	12,6	Kepe Mayeri kuning
41	les041	*Chaetodon pelewensis*	Dot and dash butterflyfish	3.50	12	Kepe Sintrun
42	les042	*Chaetodon rafflesi*	Latticed butterflyfish	3.00	10	Kepe Nanas
43	les043	*Chaetodon reticulatus*	Reticulated butterflyfish	5.00	10	Kepe Kalong
44	les044	*Chaetodon speculum*	oval sport butferflyfish (S,M)	1.50,2.50	16,6	Kepe Bulan
45	les045	*Chaetodon tplebius*	Blue dash butterfly fish (S,M)	1.00,1.50	16,6	Kepe Kuning
46	les046	*Chaetodon trifacialis*	Chevroned butterflyfish			kepe pasang roti
47	les047	*Chaetodon ulietensis*	Pacific double sadledbutterfly	2.50	12	Kepe Piramid
48	les048	*Chaetodon vagabundus*	Vagabond butterflyfish			Kepe tikar ekor kuning
49	les049	*Chaetodon xanthurus*	Cross-hatch butterflyfish			Kepe pantasi
50	les050	*Cheatodon boronessa*	Pacific triangular butterflyfish			Kepe merak
51	les051	*Chelmon rostratus*	Beaked coralfish			Kepe monyong Zebra
52	les052	*Forcifinger flvissimus*	Long-nose butterflyfish	4.00	10	Kepe Monyong asli
53	les053	*Forcifinger longirostris*	Very long-nose Butterflyfish			Kepe monyong
54	les054	*Hemitaurichthys polylepis*	Piramid butterflyfish	3.00	12	Kepe piramid

Damsel Fish

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
55	les055	*Amphiprion akallopisos*	Western skunk anemonefish	3.00	100	Pelet putih
56	les056	*Amphiprion clarkii*	Clarks anemonefish	1.00	80	Giro pasir
57	les057	*Amphiprion frenatus*	Bridled anemone fish			Tompel jakarta
58	les058	*Amphiprion melanopus*	Black anemonefish	1.00	100	Tompel
59	les059	*Amphiprion ocellarisus*	Western clown anemonefish	4,50	100	Klonfish
60	les060	*Amphiprion percula*	Eastern clown anemonfish			Klonfish biak
61	les061	*Amphiprion polymnus*	Panda clown fish	5.00	80	Giro Negroit
62	les062	*Chrisesitera parasema*	Yellow tail blue damsel			Blue band
63	les063	*Chromis analis*	Yelow puller	1.50	80	Betok kuning
64	les064	*Chromis atripectoralis*	Blue green puller	1.50	80	Jae - jae
65	les065	*Chromis margariifer*	Half & half puller			Putri Bali / Merah
66	les066	*Chryseptera cyanea*	Sky blue damsel	7.00	80	Blue Devil
67	les067	*Chryseptera rollandi*	Blue-headed damsel			Betok susu
68	les068	*Chryseptera tricincta*	Three band damsels (S,M)	1.20,1.50	100,60	Betok sebra
69	les069	*Chryseptwera leucopoma*	Surgeon damsel	3,00	60	Betok Kb
70	les070	*Chrysiptera talboti*	Talbots damsel	1.00	80	Bintang malam
71	les071	*Abudefduf vaigiensis*	Common sergeant.	3.00	80	Sersan Mayor
72	les072	*Cryseptera caeruleolineata*	Neon damsel	2,00	50	Manukan
73	les073	*Crysiptera leucopama*	Surgeon damsel	3.00	100	Pelet asli
74	les074	*Dascilus carneus*	Indian humbug			Dakocan putih
75	les075	*Dascilus trimaculatus*	Three sport dascylus	5.00	100	Dakocan hitam
76	les076	*Dascylus aruanus*	Humbug	4.00	100	Sebra Jakarta
77	les077	*Dascylus melanurus*	Black tail humbug	4.00	100	Sebra Surabaya
78	les078	*Paraligphidodon melas*	Royal damsel (S,M)	0.75,3.00	60,60	Dasi Biru
79	les079	*Plectrogphidodon dikii*	Diks damsel	3,00	80	Putri Bali Merah
80	les080	*Plectrogphidodon lacrymatus*	Jewel damsel			Betok totol
81	les081	*Pomancentrus coelestis*	Blue damsel			Kepodangan
82	les082	*Pomancentrus sp 1*	Yellow belly damsel	6.00	80	Kepudangan asli
83	les083	*premnas biaculeatus*	Spine cheek anemonefish	5.00	60	Balong

Wrass						
No	**CODE**	**SCIENTIFIC NAME**	**COMMON NAME**	**Price US $**	**Qty/Box**	**LOCAL NAME**
84	les084	*Anampese caeruleopunctatus*	Diamond wrasse	1.00	40	Kl. Mutiara
85	les085	*Anampese lineatus*	whitedashed wrasse	6.00	40	Kl. Totol B
86	les086	*anampses melanurus*	white spotted wrasse	3.00	20	Kl. Totol Model
87	les087	*Anampses meliagridis*	speckled wrasse	1.50	40	Kl. Totol Asli
88	les088	*Bodians mesothorax*	Black-belt hogfish			Elang laut B
89	les089	*Bodianus anthioides*	Lyre tail hogfish	3.00	40	Elang laut A
90	les090	*Bodianus axillaris*	Coral hogfish	1.50	40	Anjing Laut
91	les091	*Bodianus bilunulatus*	Saddle back hogfish	1.80	12	Bajing laut
92	les092	*Bodianus bimaculatus*	Yelow hogfish			Nokfisf
93	les093	*Bodianus diana*	Diana's hogfish	2.00	12	Hok. Merah
94	les094	*Bodianus Diana*	Diana hogfish	2,00	12	Hok. Titik
95	les095	*Bodianus mesothorax*	Black belt hogfish	1.80	12	Hok. Belang
96	les096	*Cetoscarus bicolor*	Two colour parrotfish	0.75	16	Noknang
97	les097	*Cirrhilabrus cyanopleura*	Red-eyed wrasse			Kko.kk
98	les098	*Cirrhilabrus cyanopleura*	Red-eyed wrasse			Kko.
99	les099	*coris aygula*	Clown coris	2.00	12	Kl. Dom
100	les100	*Coris gaimard*	gaimard wrasse	4.00	20	Kl. Asli
101	les101	*Coris gaimard juv*	Gaimard wrasses	4.00	20	Kl. Merah
102	les102	*Gomphosus varius*	Bird nose wrase	7.50	60	Kl. Cocot ijo
103	les103	*Gomphosus varius*	Bird nose wrase			kl.cocot abu
104	les104	*Hegyminus fasciatus*	Banded thicklip	2.10	24	Kl. Kenari Model
105	les105	*Helichoeres chrysus*	Yellow wrasse			Kl. Kuning
106	les106	*Helichoeres hortulanus*	Checkerboard wrasse	6.00	24	Kl. Perak
107	les107	*Helichoeres hortulanus Juv*	Checkerboard wrasse	3.50	40	Kl. Mata
108	les108	*Helichoeres marginatus*	Dusky wrasse			Bayeman topeng
109	les109	*Helichoeres prosopeion*	Half-grey wrasse			Hogfish polos
110	les110	*Hemigymnus melapterus*	Half & half wrasse			Tikusan
111	les111	*Hologymnosus annulatus*	Ringed wrasse			Pensil
112	les112	*Labroides alleni*	Frosty tail wrasse	5.00	40	Dokter Neon
113	les113	*Labroides bicolor*	Two colour cleaner	3.50	40	Dokter Asli
114	les114	*Labroides dimiatus*	Cleaner wrasse	1.00	40	Dokter Biasa
115	les115	*Labroides pectiralis*	Yelow cleaner	5.00	40	Dokter Mas
116	les116	*Macropharyngodon Meleagris*	Black leopard wrasse	2.10	24	Kl. Negro
117	les117	*Macropharyngodon Meleagris*	Leopard wrasse	6.00	24	Kl. Batik
118	les118	*Nonaculithys taeniourus*	reindeer wrasse	4.00	20	Kl. Kalong

Wrass (Continued)

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
119	les119	*novaculithys taeniourus*	Rockmover wrasse	4.00	20	Kl. Tanduk
120	les120	*Paracheilinus filamentesus*	Filamented flasher			Dian fish ekor cagak
121	les121	*Paracheilinus maccoskeri*	Mc cosker's flasher			Dian fish ekor bulat
122	les122	*Pixie coris*	Coris pictoides	3.30	40	Timunan
123	les123	*Pseudocheilinus hexataenia*	Six-line wrasse			Kl.liris
124	les124	*Pseudocheilinus octanea*	Eight-line wrasse			Kl.liris asli
125	les125	*Pseudocheilinus octanea*	pin-striped wrasse			Monalisa
126	les126	*Pseudodax mollucanus*	Chisel tooth wrasse	3.00	40	Dokter Model
127	les127	*Thalassoma amlycephalum*	Padle-fin wrasse			Bayeman
128	les128	*Thalassoma lanure*	Moon wrasse			Talasoma ijo
129	les129	*Xyrichthys pavo*	Blue razorfish			Kl. Tanduk

Banner Fish & Morris Idol

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
130	les130	*Heniochus acuminatus*	Common bannerfish			layaran
131	les131	*Heniochus chrysostomus*	Pennant bannerfish			layaran asli
132	les132	*Heniochus varius*	Horned bannerfish			kambingan
133	les133	*Henochus SP*	Banner Fish	2.00	12	Layaran Kuning
134	les134	*Zanclus cornutus*	Moorish idol	2.00	12	Muris

Surgeon Fish & Tangs

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
135	les135	*Acanthurus leucosternon*	Powder blue surgeon	12.50	6	Botana Biru
136	les136	*Acanthurus lineatus*	Lined surgeon	3.00	12	Botana Kasur
137	les137	*Acanthurus maculiceps*	Spot - face surgeon	2.00	12	Botana Batu
138	les138	*Acanthurus nigricans*	Velvet surgeon	3.00	10	botana kaca mata
139	les139	*Acanthurus olivaccus*	Orange - blotch surgeon	4.00	10	Botana Kapsul
140	les140	*Acanthurus Pyroferus*	Mimic surgeon	3.00	12	Botana model
141	les141	*Acanthurus Pyroferus juv*	Mimic surgeon	2.00	12	Botana Mimik
142	les142	*Acanthurus triostegus*	Convict surgeon	1.00	12	Botana Lorek
143	les143	*Acanthurus xanthopterus*	Yellow - masked surgeon	3.00	12	Botana Coklat
144	les144	*Acanthurus Olivaceus juv*	Orange - blotch surgeon			Botana kuning
145	les145	*Acanthurus SP*	Mimic surgeon			Botana abu liris
146	les146	*Naso Lituratus*	Orange - spine unicornfish			Botana naso
147	les147	*Naso Unicornis*	Shortnose Unicornfish			Botana naso Putih

Surgeon Fish & Tangs (Continued)

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
148	les148	*Paracanthurus hepatus*	Blue surgeon	25.00,6.00,7.00	30,12,6	Leter six
149	les149	*Paracheilinus carpenteri*	Red - fin flasher			Dianfish
150	les150	*Siganus coralinus*	Coral rabbitfish	1.50	12	Samadar kuning
151	les151	*Siganus vulpinus*	Fox - face	2.00,3.00	12,12	Samadar cicit
152	les152	*Zebrasoma scopas*	Two - tone surgeon	1.50,2.00	12,6	Burung Laut
153	les153	*Zebrasoma veliferum*	Sail - fin surgeon	3.50,4.50	20,6	Keranjang Bali

Trigger & Box Fish

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
154	les154	*Arothron nigropunctatus*	Black spotted puffer	3.00	12	Buntel Babi
155	les155	*Balistapus undulatus*	Striped trigger - fish	2.00	12	Triger Liris
156	les156	*Balistoides conspicillum*	Clown triggerfish (S,M)	30.00,40.00	10,6	Triger Kembang
157	les157	*Cantherhinus pardalis*	Honey comb leather - jacket	6.00	12	Sonang Biasa
158	les158	*Canthigaster valentini*	Saddled puffer	3.00	16	Buntel Valentini
159	les159	*Canthigaster epilampra*	Grey-top puffer	3.00	12	Buntel Lumut
160	les160	*Canthigaster solandri*	False-eyed puffer			Buntel totol
161	les161	*Chaetodema peniciligera*	Weedy filefish	3.00	12	Sonang Rambut
162	les162	*Cyclichthys orbicularis*	Rounded porcupine-fish			Buntel nanas
163	les163	*lactoria cornuta*	long-horn cow-fish			Sapi-sapi kuning
164	les164	*Lactoria fornasini*	Thorny-back cow-fish			sapi-sapi
165	les165	*Melichthys indicus*	Indian triggerfish	2.00	12	Triger Sisir
166	les166	*Melichthys vidua*	Paddle - fin trigger - fish	1.00	12	Triger Kaca
167	les167	*Ostracion cubicus*	yellow box-fish	2.50	12	Koper kuning
168	les168	*Ostracion meleagris*	Black boxfish	3.20	16	Buntel Mutiara
169	les169	*Oxymonocanthus longirostris*	Coral file-fish	2.50	12	Jagungan
170	les170	*Pervagor janthinosoma*	Ear - spot filefish	3.00	12	Sonang Merah
171	les171	*pervagor melanocephalus*	Black-head filefish			Sonang api
172	les172	*Pseudobalistes fuscus*	Boomerang trigger-fish			Triger putih
173	les173	*Pseudobalistes fuscus*	yellow-spotted trigger-fish			Triger macan
174	les174	*Rhenecanthus rectangulus*	Wedge-tail triggerfish	2.00	12	Triger pictori
175	les175	*Rhinecanhus cinereus*	Strikland's triggerfish	2.50	12	Triger Matahari
176	les176	*Rhinecanthus verrucosus*	Black-blotch trigger- fish	1.75	10	Triger Motor
177	les177	*Sufflamen chrysopterus*	Half-moon triggerfish	1.50	12	Triger Babi

Platax

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
178	les178	*Platax batavianus*	Zebra batfish	2.50	12	Pelatak Kertas
179	les179	*Platax orbicularis*	Round batfish	12.50	6	Pelatak Daun
180	les180	*Platax pinnatus*	Shaded batfish			Pelatak asli
181	les181	*Platax teira*	tall-fin batfish	2.50	12	Pelatak Koran

Miscellaeous, including Sweetlips, Lion fish, Grouper

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
182	les182	*Acoliscus strigatus*	Coral shrimpfish			Piso - piso
183	les183	*Caesio xantonota*	yellow-backed fusilier			Sulir
184	les184	*Calloplesiops altivelis*	Comet			Krapu kodam
185	les185	*Chromileptes altivelis*	Barramundi cod	0.75	40	Greskeli
186	les186	*Chromileptes Falco*	Coral hawkfish	1.00	12	Krapu Tokek
187	les187	*Cyrrinocirrhites polyactis*	Lyre-tail hawkfish			Krapu loncat
188	les188	*Dactyloptena orientalis*	Flying gurnard			Mandarin terbang
189	les189	*Dendrochirus biocellatus*	zebra lionfish	3.00	12	barong kembang
190	les190	*Dendrochirus zebra*	Two-eyed lionfish	2.5	12	barong gajah
191	les191	*Doryhamphus janssi*	Janss pipefish	3.50	8	Bajulan Api
192	les192	*Doryrhamphus dactyliophorus*	Banded pipefish	3.50	12	Bajulan Zebra
193	les193	*Doryrhamphus multiannulatus*	Multibar pipefish	4.00	8	Bajulan Kuning
194	les194	*Hippocampus*	White's sea-horse	3.00	8	Kuda Laut
195	les195	*Lutjanus sebae*	Red Emperor	4.00	12	Lutjanus
196	les196	*Macolor niger*	Black snapper			Kompili terbang A
197	les197	*Macolor niger*	Black snapper	2.00	12	Kompili Terbang
198	les198	*Oxycirrhites thypus*	Longnose hawkfish	1.00	12	Krapu Buaya
199	les199	*Paracirrhites arcatus*	Ring eyed hawkfish	1.00	8	Krapu Pelet
200	les200	*Plectorhinchus lessoni*	Lined sweetlips	3.50	12	Kompili liris
201	les201	*Plectorhynchus chaetodon*	Harlequin sweetlips			Brownkely
202	les202	*Plectrhinchus orientalis*	Oriental sweetlips	5.00	12	Macanan
203	les203	*Pseudanthias dispar*	Fairy basslet	2.50	12	Nona Manis
204	les204	*Pseudanthias evansi*	Yellow tail basslet			Bibir merah setrip
205	les205	*Pseudanthias huchtii*	Pacific sea-perch	3.00	12	Rainbow Ijo
206	les206	*Pseudanthias hypselosoma*	Pink sea-perch			Rainbow campur
207	les207	*Pseudanthias luzonensis*	Luzon sea-perch	2.00	12	Rainbow Kuning
208	les208	*Pseudanthias pleurotaenia*	Mirror basslet	2.00	12	Rainbow Kotak

Miscellaeous, including Sweetlips, Lion fish, Grouper (Continued)

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
209	les209	*Pseudanthias squamipinnis*	Jewel basslet	1.25	12	Rainbow Merah
210	les210	*Pseudanthias tuka*	Purple queen	1.5	12	Bibir Ungu
211	les211	*Pseudochromis paccagnellae*	Two-colour dottyback			Cantik
212	les212	*Pterois antennata*	Spot fin lionfish	3.00	12	Antenata
213	les213	*Pterois radeata*	White-lined lionfish	3.00	8	Radiata
214	les214	*Pterois volitans*	Common lionfish	5.00	8	Volitan
215	les215	*Solenostomus paradoxus*	Ornate ghost-pipefish			Kuda rambut
216	les216	*Synanceia verrucosa*	Reef stonefish			Scorpion
217	les217	*Taenianotus triacanthus*	Paper stonefish			Ikan sampah
218	les218	*Variola louti*	Common lyretail cod	1.00	12	Krapu Mp

Eel

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
219	les219	*Rhinomuraena quaesita black*	Ribbon eel	3.00	4	Ular Hitam
220	les220	*Gymnothorax prosopeion*	Pearly-eyed moray	8.00	6	Ular Putih
221	les221	*Gymnothorax zebra*	Zebra moray	12.50	6	Mang Zebra
222	les222	*Rhenomuraena eqesita*	Ribbon eel			Ular Biru

Gobies

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
223	les223	*Amblyeleotris sp.2*	Eye-brow shrimp-goby	2.00	40	Jabing Arora
224	les224	*Caranggoides ferdau*	Banded trevally			Pidana
225	les225	*Cirripectecs springeri*	Spotted eyelash-blenny			Jabing hitam palsu
226	les226	*Ecsenius bicolor*	Two-colour comb-tooth	1.50	40	Jabing Merah
227	les227	*Ecsenius hamiyei*	Black comb tooth			Jabing hitam
228	les228	*Ecsenius midas*	Lyre tail comb-tooth	5.00	40	Jabing Walet
229	les229	*Exallias brevis*	Pink spotted blenny	2.50	40	Jabing Bunga
230	les230	*Malacanthus brevirostris*	Flagtail blanguillo			Roket terbang
231	les231	*Nemateleotris decora*	Purple fire-goby	5.00	40	Roket Anten Ungu
232	les232	*Nemateleotris magnifica*	Redfire-goby	5.00	40	Roket Anten Merah
233	les233	*Parupeneus barberinoides*	Half & half goatfish	4.00	40	Jenggot Model
234	les234	*Parupeneus cyclostomus*	Yallow-saddle goatfish			jenggot kuning
235	les235	*Parupeneus multifasciatus*	banded goatfish	3.50	40	Jenggot Biasa
236	les236	*Plagiotremus laundandus*	False half-tail	2.00	40	Jabing Model
237	les237	*Ptereleotris evides*	Arrow dart-goby	3.00	40	Roket B

Gobies (Continued)

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
238	les238	*Ptereleotris evides heteroptera*	Tail spot dart-goby	1.20	40	Roket Asli
239	les239	*Ptereleotris hanae*	Thread-tail dart-goby			Roket Bandit
240	les240	*Ptereleotris monoptera*	Lyre tail dart-goby	4.50	40	Roket Polos
241	les241	*Ptereleotris zebra*	Zebra dart-goby	3.00	40	Roket Belang
242	les242	*Salarias fasciatus*	Banded blenny	1.00	40	Jabing Biasa
243	les243	*Valenciennea helsdingeni*	Black-lined steeper			Bunglon setrip
244	les244	*Valenciennea puellaris*	Orange-spotted steeper			Bunglon titik
245	les245	*Valenciennea strigata*	Golden-headed steeper			Bunglon B

Shrimp

No	CODE	SCIENTIFIC NAME	COMMON NAME	Price US $	Qty/Box	LOCAL NAME
246	les246	*Periclemenes sp*	Fire Shrimp	3.50	40	Udang Api
247	les247	*Rhynchocinetes sp*	Wayang Shrip	1.00	80	Udang Wayang
248	les248	*Stenopus sp*	Banded Shrimp	1.00	60	Udang Agung
249	les249	*Panulirus Sp*	Ornamental Shrimp	3.00	40	Udang Lobster
250	les250	*Lismata sp*	Cleaner Shrimp	2.50	60	Udang Bronkely
251	les251	*Periclemenes Sp*	Anemone Shrimp	1.00	60	Udang Anamun
252	les252					Udang mp
253	les253					Udang mp ungu
254	les254					Udang pelet
255	les255					Udang pancasila

Data in these tables is based on information from the comapny PT Bahtera Lestari, whoses trademarks are shown below:

Appendix 20. Species of Fish caught in Desa Bangsring and Price Paid by Exporter

No	SCIENTIFIC NAME	COMMON NAME	LOCAL NAME	PRICE
1	*Apolemichthys trimaculatus*	Three-spot angle fish	Ag. Asli	Rp 16,500
2	*Centropege bispinosus*	Coral beauty angelfish	Ag. Model	Rp 9,900
3	*Centropege Nox*	Midnight angelfish	Ag. polos	Rp 2,200
4	*Centropyge flavicauda*	Damsel angelfish	Ag. Ungu	Rp 2,200
5	*Centropyge tibicen*	Keyhole anglefish	Ag. Biru	Rp 2,200
6	*Centropyge vrolickii*	Pearl scalled angelfish	Ag. Abupolos	Rp 1,650
7	*Chaertodontoplus mesoleucus*	Vermiculate angelfish	Ag.Marmut e.kuning	Rp 1,000
8	*Chaetodontoplus melanosoma*	Black velvet angelfish	Ag. Melati	Rp 16,500
9	*Chaertodon kleini*	Brown butterflyfish	Kepe Coklat	Rp 2,000
10	*Chaetodon auriga*	Thread butterflyfish (S,M)	Kepe Auriga	Rp 5,500
11	*Chaetodon burgessi*	Citron butterflyfish	Kepe Susu	Rp 11,000
12	*Chaetodon burgessi*	Black barred butterflyfish (S)	Kepe Burgesi	Rp 4,000
13	*Chaetodon lineotus*	Lined butterflyfish (S)	Kepe Angsa	Rp 2,000
14	*Chaetodon lineotus*	Lined butterflyfish (M)	Kepe Angsa	Rp 4,000
15	*Chaetodon lunula*	Raccon butterflyfish (S)	Kepe Gajah	Rp 5,500
16	*Chaetodon lunula*	Raccon butterflyfish (M;L)	Kepe Gajah	Rp 11,000
17	*Chaetodon lunulatus*	Pacific pinstriped butterfly (S,M)	Kepe Doreng	Rp 5,000
18	*Chaetodon mayeri*	Meyer's butterfly fihs	Kepe Mayeri hitam	Rp 11,000
19	*Chaetodon melanopus*	Two eyed coralfish (S)	Kepe monyong B	Rp 3,500
20	*Chaetodon melanopus*	Two eyed coralfish (M)	Kepe monyong B	Rp 5,000
21	*Chaetodon mertensii*	Mertens butterflyfish (S)	Kepe Tikar	Rp 1,500
22	*Chaetodon mertensii*	Mertens butterflyfish (M)	Kepe Tikar	Rp 2,000
23	*Chaetodon Ornatus*	Ornate butterflyfish (S;M)	Kepe Mayeri kuning	Rp 5,500
24	*Chaetodon Ornatus*	Ornate butterflyfish (L)	Kepe Mayeri kuning	Rp 11,000
25	*Chaetodon pelewensis*	Dot and dashbutterflyfish (S)	Kepe Cintrun	Rp 1,100
26	*Chaetodon pelewensis*	Dot and dashbutterflyfish (M)	Kepe Cintrun	Rp 2,200
27	*Chaetodon rafflesi*	Latticedbutterflyfish	Kepe Nanas	Rp 2,200
28	*Chaetodon reticulatus*	Reticulatid butterflyfish (S)	Kepe Kalong	Rp 1,500
29	*Chaetodon reticulatus*	Reticulatid butterflyfish (M)	Kepe Kalong	Rp 2,000
30	*Chromis analis*	Yelow pullerl	Betok kuning	Rp 660
31	*Chromis atripectoralis*	Blue green puller	Jae - jae	Rp 660
32	*Chromis margariifer*	Half & half puller	Putri Bali / Merah	Rp 660
33	*Chryseptera cyanea*	Sky blue damsel	Blue Devil	Rp 660
34	*Chryseptera rollandi*	Blue-headed damsel	Betok susu	Rp 660
35	*Chryseptera tricincta*	Three band damsels S,M)	Betok sebra	Rp 660
36	*Chryseptwera leucopoma*	Surge damsel	Betok Kb	Rp 550
37	*Chrysiptera talboti*	Talbots damsel	Bintang malam	Rp 660
38	*Comon sergeant.*	Abudefduf vaigiensis	Sersan Mayor	Rp 550
39	*Cryseptera caeruleolineata*	Neon damsel	Manukan	Rp 660
40	*Crysiptera leucopama*	Surgeon damsel	Pelet asli	Rp 1,650
41	*Dascilus carneus*	Indian hambug	Dakocan putih	Rp 550
42	*Paraligphidodon melas*	Royal damsel (M)	Dasi Biru	Rp 660
43	*Plectrogphidodon dikii*	Diks damsel	Putri Bali Merah	Rp 660
44	*Plectrogphidodon lacrymatus*	Jewel damsel	Betok totol	Rp 660
45	*Bodianus mesothorax*	Black belt hogfish	Hok. Belang	Rp 3,300
46	*Cetoscarus bicolor*	Two colaur parrotfish	Noknang	Rp 3,300

No	SCIENTIFIC NAME	COMMON NAME	LOCAL NAME	PRICE
47	*Cirrhilabrus cyanopleura*	Red-eyed wrasse	Kko.kk	Rp 1,650
48	*Cirrhilabrus cyanopleura*	Red-eyed wrasse	Kko.	Rp 1,650
49	*Coris aygula*	Clown coris	Kl. Dom	Rp 27,500
50	*Coris gaimard*	gaimard wrasse	Kl. Asli	Rp 8,250
51	*Coris gaimard juv*	Gaimard wrasses	Kl. Merah	Rp 3,850
52	*Gomphosus varius*	Bird nose wrase	Kl. Cocot ijo / penguin	Rp 11,000
53	*Gomphosus varius*	Bird nose wrase	kl.cocot abu	Rp 5,500
54	*Helichoeres marginatus*	Dusky wrasse	Bayeman topeng	Rp 1,000
55	*Helichoeres prosopeion*	Haf-grey wrasse	Hogfish polos / Model	Rp 2,750
56	*Hemigymnus melapterus*	Half & half wrasse	Tikusan	Rp 1,000
57	*Hologymnosus annulatus*	Ringed wrasse	Pensil	Rp 1,000
58	*Labroides alleni*	Frosty tail wrasse	Dokter Neon	Rp 1,100
59	*Acanthurus maculiceps*	Spot - face surgeon	Botana Batu	Rp 1,100
60	*Acanthurus nigricans*	Velvet surgeon	botana kaca mata	Rp 8,250
61	*Acanthurus olivaccus*	Orange - blotch surgeon	Botana Kapsul	Rp 5,500
62	*Acanthurus xanthopterus*	Yellow - asked surgeon	Botana Coklat	Rp 1,100
63	*Acanturus Olivaceus juv*	Orange - blotch surgeon	Botana kuning	Rp 2,750
64	*Acanturus chronixis*	Mimic surgeon	Botana abu liris	Rp 2,000
65	*Naso Lituratus*	Orange - spine unicornfish	Botana naso	Rp 6,600
66	*Naso Unicornis*	Shortnose Unicornfish	Botana naso Putih	Rp 2,500

Source : KI. Bapak Sutrisna and Bapak Sudi, from Desa Bangsring

Appendix 21 - Local Financiers in Bangsring Village

From FGD on Sunday 29 October 2004 in Bapak Sutrisno's House with Bangsring Village Local Financiers

NO	Name	From
1	Satun	Desa Bangsring
2	Haji Matrif	Desa Bangsring
3	Cipto	Desa Bangsring
4	Haji Amsori	Desa Bangsring
5	Jaelani	Desa Bangsring
6	Komdan	Desa Bangsring
7	Siadi	Desa Bangsring
8	Sarif	Desa Bangsring
9	Salam	Desa Bangsring
10	Haji Yus	Desa Bangsring
11	Darsono	Desa Bangsring
12	Mosol	Desa Bangsring
13	Sukir	Desa Bangsring
14	Sugi	Desa Bangsring
15	Mahwan	Desa Bangsring
16	Misudayo	Desa Bangsring
17	Saniman	Desa Bangsring
18	Pak R	Desa Bangsring
19	Haji Sahid	Desa Bangsring
20	Surahwi	Desa Bangsring
21	Misa	Desa Bangsring
22	Jumali	Desa Bangsring
23	Buha	Desa Bangsring
24	Busahra	Desa Bangsring
25	Junaidi	Desa Bangsring
26	Sam Adi	Desa Bangsring
27	Haji Ali	Desa Bangsring
28	Haji Topik	Desa Bangsring

Appendix 22 - Ornamental Fish Collectors in Bangsring Village

From FGD in Desa Bangsring on Sunday 17 October 2004 with ornamental fish collectors

NO	NAME	OCCUPATION
1	Sutris	Financier
2	Suhawi	Ornamental Fish Collector
3	Busama	Ornamental Fish Collector
4	Hamid	Ornamental Fish Collector
5	Wagimin	Ornamental Fish Collector
6	Hanan	Ornamental Fish Collector
7	Busaidi	Ornamental Fish Collector
8	Selamat	Ornamental Fish Collector
9	Safi,I	Ornamental Fish Collector
10	Hadi	Ornamental Fish Collector
11	Suhadi	Ornamental Fish Collector
12	Musara	Ornamental Fish Collector
13	Safar	Ornamental Fish Collector
14	Asmad	Ornamental Fish Collector
15	Masuri	Ornamental Fish Collector
16	Martoyo	Ornamental Fish Collector
17	Sahwi	Ornamental Fish Collector
18	Mastugi	Ornamental Fish Collector

Appendix 23 - Exporters in Bali and their Suppliers

(*Source: IMA-Bahtera. 2002*)

Exporter	Products Traded	Supplier	Supplier Address
CV. Pasifik Bali Jl. Pantai Sari N0. 19B, Jimbaran Kuta. Bali. Phone (0361) 709508 Fax : (0361) 709507 Email : **Pasifik@dps.mega.net.id** Contact Person : Hendri Chua	Marine Ornamental Fish Live corals (illegal) Echinoderms Soft coral Shark < 1m	1. Bp Wiyanto	Jl.Raya Ketapang – Surabaya, terminal Ketapang Phone : 0333-510640
		2. Bp.Ahmad	Banyuwangi Phone: 0333-510353
		3.Bp. Nunung	Sumbawa Phone: 0372 - 91402
		4. Ngurah	Jl. Raya Gilimanuk - Singaraja Kampung Bugis
		5. Bp.Heri	Gilimanuk
		6. Bp.Sam	Singaraja
		7. Sulatri	Batu-Dodol Blk masjid, dekat Timbangan
			Phone : 0333 - 510651
		8. Hari	Jl. Gatot Subroto. BLK Balai Desa Ketapang. Phone : 0333 - 414778
PT. Intinental Pri Bali Jl. I. Gusti Ngurah Rai No.109 Denpasar 80221 Bali, Phone &Fax : (0361) 720455 E-mail: **riyanto@Intinental.com** Contact Person : Riyanto	Marine Ornamental Fish	1. M. Is Sudaya	Bangsring Samping BKPI, Banyuwangi. Phone: 0333 510857
		2. Bp. Mustari	Samping Patung Naga, Gilimanuk. Phone: 0365 61248
		3. Bp. Ali	Gilimanuk Hp : 0818938475
		4. Bp. Jeani	Bulusan, Banyuwangi Phone: 0333 423881
PT. Lintas Antar Nusa Farm. Pulau Serangan Banjar Ponyok Phone : 0361.416328 E-mail: ptlasea@indosat.net.id Contact Person : Ilham Cindra	Marine Ornamental Fish Live corals (illegal) Echinoderms Shark < 1m	1 junaedi	Serangan.
		2. Joko	Flores.
		3. Ketut	Nusa penida, desa Jungut Batu
PT. Bali Blue International Jl. Uluwatu- Gg. Pasir Putih No.1 Tuban, Kuta, Bali Phone : 0361 – 701670-701672 Fax : 701671- 703317 Email: Baliblue@dps.mega.net.id Contac : I Putu Sukadana	Marine Ornamental Fish Live corals (illegal) Algae, Echinoderms Shark < 1m	H. Matarim	Bangsring, Banyuwangi Phone :0333 - 510404
		Bp. Nunung	Sumbawa Phone: 0372 - 91402
		Sulatri	Batu-Dodol Blk masjid, dekat Timbangan
			Phone : 0333 - 510651
		Hari	Jl. Gatot Subroto. BLK Balai Desa Ketapang.
			Phone : 0333 - 414778

Exporter	Products Traded	Supplier	Supplier Address
CV. Dinar. Banjar Kesambi - Kerobokan- Kuta - Badung 80361 Bali Phone : 0361- 420712 Email : boydinar@dps.mega.net Contac : Agung Setiabudi	Marine Ornamental Fish Live corals (illegal) Echinoderms Shark < 1m	No data	
PT. Segitiga Bali Dusun Yeh Malet, Desa Antiga Kec. Manggis, Kab. Karang Asem 0366 - 30766 Ohasi Yahoko, Cok Damayanti	No data	No data	

Appendix 24. Destination Countries of Bali Exporters

No	Company Name	Country of Destination
1	UD Mina Sari Sedana	Korea, Denmark, Malaysia, Germany, Austria, Switzerland, New Zealand
2	UD Tanjung Sari	France, Germany, USA, Switzerland, United Kingdom, Denmark, Republic of Chekoslovakia, Netherlands, Japan
3	PT Krisna Basama	USA, Singapore
4	PT Nusa Lautan	Japan, Belgium, Italy, Germany
5	PT Panca Naga Jaya	Japan, Canada, USA, Australia
6	PT Patra Bali Mandiri	Argentina
7	PT Segitiga Bali	Japan, Italy, USA
8	PT Pacific Bali	Korea, Denmark, Malaysia, Germany, Austria, Switzerland, New Zealand
10	PT Bali Biru	USA, Germany, Italy, Spain
11	PT Bali Baruna Aquarium	France, Germany, USA, Switzerland, United Kingdom, Denmark, Republic of Chekoslovakia, Netherlands, Japan
13	PT Lintas Antar Nusa	Japan
14	PT Mitra Sahata	Korea, Denmark, Malaysia, Germany, Austria, Switzerland, New Zealand
15	PT Demonia Perkasa	Japan
16	PT Bali Blue International	USA, Germany, Italy, Spain
17	CV Dinar	France, Germany, USA, Switzerland, United Kingdom, Denmark, Republic of Chekoslovakia, Netherlands, Japan
18	CV Anugrah Tirta S	USA, Japan
19	CV Citra Nusantara Abadi	Germany, Austria
20	CV Agung	Japan
21	CV Cahaya Baru	France, Germany, USA, Switzerland, United Kingdom, Denmark, Republic of Chekoslovakia, Netherlands, Japan
22	CV Bali Ocean	Spain , Belgium, Germany

Source : Laporan Ekspor Perikanan Per Perusahaan dengan Negara Tujuan
Dinas Perikanan Propinsi Bali & Balai Karantina Bandara Ngurah Rai, Propinsi Bali
Per Oktober 2000. (Ima-Bahtera 2001)

Appendix 25 - Photographs of Ornamental Fish Collection & Packing

1. Free Diving Fishermen

They use masks, snorkels, and fins to free dive. They also use “serok”, “Ban dalam" or inner tyre tubes (For storing O2), Cyanide, and nets to catch the fish

They are still using sodium cyanide

2. Hookah (compressor) Fishermen

They are using Hookah, to dive to depths between 20-20 and 40 metres. Diing with hookah like this they catch many fish, especially the more expensive species.

3. Long-Distance Fishermen (Nelayan Sebrangan)

These fishermen travel long distances on boats of up to 17GT. Often their fishing trips last for 15-20 days, and visit many other islands, including Sulawesi and the small islands around it.

4. Packing at the Local Financier's Facility

These fish are being packed in Bangsring Village, for shipping to Denpasar, Bali, by road.